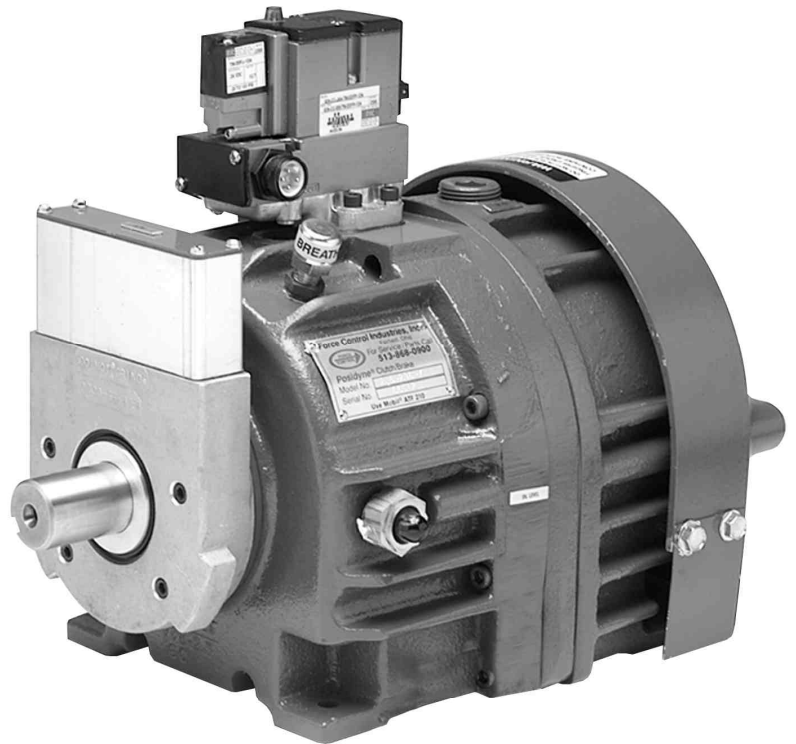




502-2.5-001-02

# **SERVICE MANUAL AND REPAIR PARTS FOR *Size 2.5 Posidyne®* *CLUTCH/BRAKE DRIVES***



**FORCE CONTROL INDUSTRIES, INC.**

**WARNING - Read this manual before any installation, maintenance and operation.**

**MANUFACTURERS OF MECHANICAL AND ELECTRICAL POWER TRANSMISSION EQUIPMENT**



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## Section 1

### DESCRIPTION and OPERATION

#### 1-1 THE OIL SHEAR PRINCIPLE

Conventional clutches and brakes depend on the friction between solid surfaces operating in air to transmit torque. Friction does the job, but produces a great amount of heat and wear. The 2.5 Posidyne Clutch/Brake unit is an oil shear drive, with the friction surfaces operating in a bath of oil. The oil molecules tend to cling to each other, and to the friction surfaces. As moving and stationary elements are brought together, a thin but positive film of oil is maintained between them. The oil film is controlled by a clamping pressure and by carefully designed grooves in the elements. Torque is transmitted from one element to the other through the viscous shear of the oil film. So long as there is relative motion between the elements, they are protected by the oil, thus greatly reducing wear. The oil bath also effectively transmits heat away from the friction elements.

#### 1-2 DESCRIPTION

(See Figure 1.1)

In the 2.5 Posidyne Clutch/Brake, the friction surfaces consist of alternate carbon steel plates and advanced friction material on steel discs. The oil control grooves are molded into the friction material disc surfaces. The discs have internal teeth which mate with a spline on the output shaft for both clutch and brake applications. The steel plates are keyed to the input shaft in the clutch and to the housing for the brake when used. The splined sections of the Posidyne output shaft contain centrifugal impellers to maintain a positive flow of oil between the discs and plates.

As noted in Section 2, Specifications, standard Posidyne units may be equipped with a clutch and a brake, or a clutch only. The Clutch is normally operated by compressed air, although hydraulic pressure can be used. The Posidyne brake may be pressure operated, or it may be spring loaded to operate automatically when the clutch is released, or a combination of both springs and pressure.

#### 1-3 OPERATION

The 2.5 Posidyne cross-section (Figure 1.1) shows the drive with the Brake engaged. A nominal braking force is provided by springs located in the Piston Retainer. Heavier springs are used to provide a greater braking force, when needed. Air Assist (as shown), controlled by external valves, also provides a greater braking force. The drive is normally in the Brake Position. The Drive Plates are keyed to the Output Housing and the Friction Discs are splined to the Output Shaft. The Output Shaft is not able to rotate in this Brake Position.

The Clutch is engaged when the air pressure is exhausted from the Brake Port and applied to the Clutch Port. The Piston moves to compress the Clutch Stack on the Input Shaft. The Drive Plates are keyed to the Input Shaft and the Friction Discs are splined to the Output Shaft. This allows both shafts to rotate at the same speed.

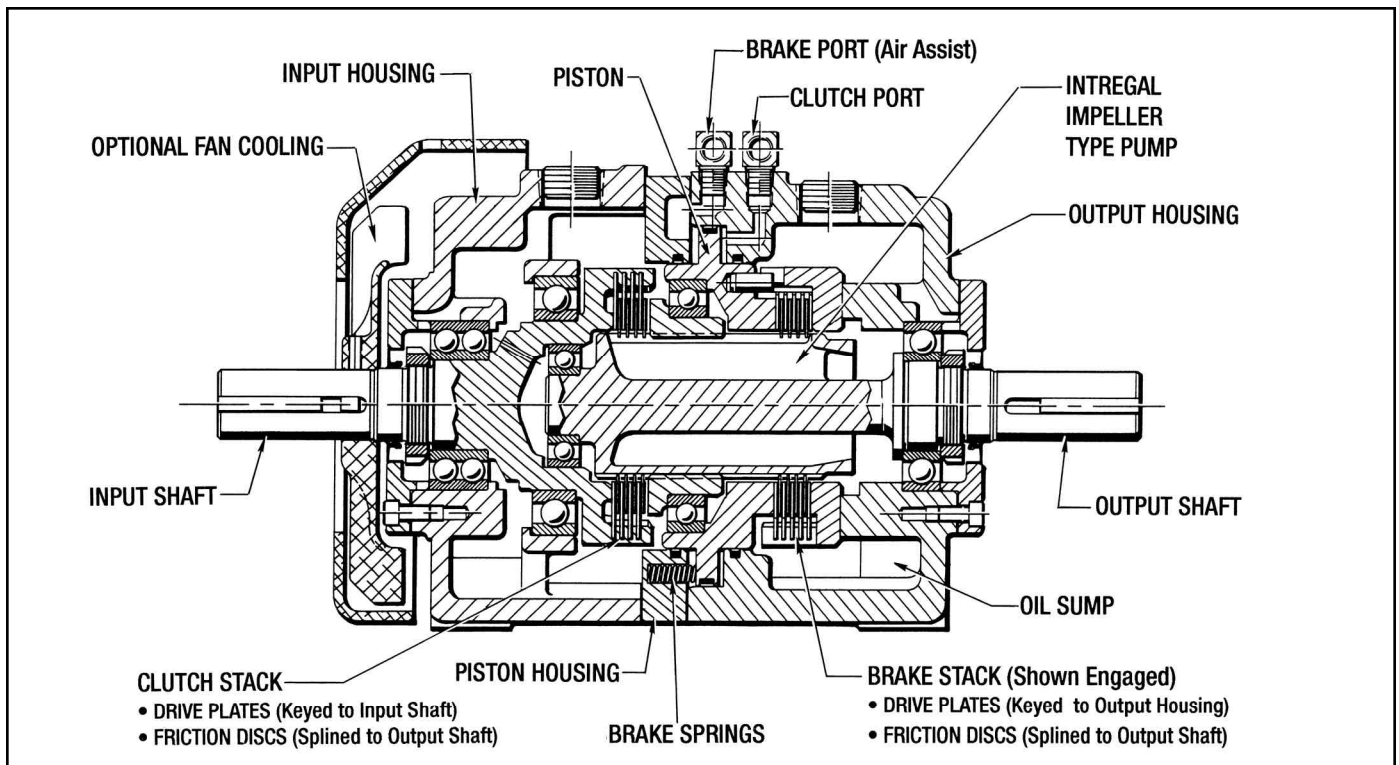


Figure 1.1 - 2.5 Posidyne Clutch/Brake Unit

## Section 2

### SPECIFICATIONS

#### (2.5 Posidyne CLUTCH/BRAKE)

#### 2-1 MODEL DESIGNATIONS

The model designations specifies the size (2.5) and internal logic type. The types are:

- S** - Pressure actuated clutch, pressure actuated brake.
- SA** - Air set clutch, medium spring set brake with air assist.
- A** - Pressure actuated clutch, medium spring actuated brake (See NOTE following).
- B** - Pressure actuated clutch, heavy spring actuated brake (See NOTE following).
- C** - Pressure actuated clutch, no brake.
- SCP** - Self centered piston, air set clutch and air set brake.
- P** - Pressure actuated clutch and brake, No springs.

#### NOTE:

Type A and B units both have spring actuated brakes. The difference is that type B units have additional springs.

#### 2-2 OPERATING SPECIFICATIONS

Operating Specifications for the *Posidyne* Clutch/Brake Drives are listed in the **Table 2.1** below.

#### TORQUE RATINGS

The torque ratings listed are based on maximum actuation pressure as specified in the Table below.

#### Operating Specifications (Table 2.1)

| Size | Logic | Max. Clutch Torque<br><i>(Lb. In.)</i> |       |                   | Max. Brake Torque<br><i>(Lb. In.)</i> |      |                           |       |              | Max.<br><i>(RPM)</i>   |               | Max.<br>KEper<br>Engmt.<br><i>(Ft. Lbs.)</i> | Average<br>Thermal HP<br>Cooling* |     |             | Air<br>Vol.<br>per<br>Engmt.<br><i>(In. <sup>3</sup>)</i> | Oil<br>Cap.<br><i>(Qts.)</i> | Inertia<br>of<br>Cyclic<br>Parts<br><i>(Lb. Ft.<sup>2</sup>)</i> |
|------|-------|----------------------------------------|-------|-------------------|---------------------------------------|------|---------------------------|-------|--------------|------------------------|---------------|----------------------------------------------|-----------------------------------|-----|-------------|-----------------------------------------------------------|------------------------------|------------------------------------------------------------------|
|      |       | Static                                 | Dyn.  | Δ Max.<br>Air Pr. | Springs Only                          |      | With Max. Air Assist<br>Δ |       |              | Basic<br>& Fan<br>Cool | Water<br>Cool |                                              | Cooling*                          |     |             |                                                           |                              |                                                                  |
|      |       |                                        |       |                   | Static                                | Dyn. | Static                    | Dyn.  | Max. Air Pr. |                        |               |                                              | Basic                             | Fan | Water<br>** |                                                           |                              |                                                                  |
| 2.5  | S     | 1,116                                  | 960   | 60 psi            | 103                                   | 89   | 1,183                     | 1,017 | 60 psi       | 1800                   | 3600          | 15,865                                       | Horizontal                        |     |             | 5                                                         | 6                            | .20                                                              |
|      | SA    | 1,245                                  | 1,071 | 80 psi            | 418                                   | 361  | 1,378                     | 1,185 | 40 psi       |                        |               |                                              | .70   2.00   4.00                 |     |             |                                                           |                              |                                                                  |
|      | A     | 1,237                                  | 1,064 | 80 psi            | 418                                   | 361  | ---                       | ---   | ---          |                        |               |                                              | -----                             |     |             |                                                           |                              |                                                                  |
|      | B     | 794                                    | 683   | 80 psi            | 835                                   | 721  | ---                       | ---   | ---          |                        |               |                                              | Vertical                          |     |             |                                                           |                              |                                                                  |
|      | C     | 1,063                                  | 914   | 60 psi            | ---                                   | ---  | ---                       | ---   | ---          |                        |               |                                              | .35   1.00   2.00                 |     |             |                                                           |                              |                                                                  |
|      | SCP   | 1,234                                  | 1,061 | 60 psi            | ---                                   | ---  | 1,051                     | 904   | 60 psi       |                        |               |                                              |                                   |     |             |                                                           |                              |                                                                  |
|      | P     | 1,260                                  | 1,084 | 60 psi            | ---                                   | ---  | 1,080                     | 929   | 60 psi       |                        |               |                                              |                                   |     |             |                                                           |                              |                                                                  |

NOTES: \* - Ratings based on 1800 RPM operating speed and 70° ambient temperature.

\*\* - Cooling water flow requirements in GPM equals .10 x calculated thermal horsepower load.

Δ - Listed air pressures are at maximum. Operating pressures are generally much lower,



## Section 3 INSTALLATION

### 3-1 RECEIVING THE DRIVE

Check the drive for shortage or damage immediately after arrival. Prompt reporting to the carrier's agent, with notations made on the freight bill, will expedite satisfactory adjustment by the carrier. When unloading or handling the drive, keep it upright. All Drives are filled with oil, ready to run, when shipped. However, before placing the unit in service or storage, check the oil level to make sure none has spilled out in transit. Add oil if necessary (refer to Section 4 Lubrication). Remove the red plastic plug and install the Air Breather (#45). If the drive is not to be installed and operated soon after arrival, store it in a clean, dry place having slow, moderate change in ambient temperature.

### 3-2 MOUNTING THE DRIVE

Installation of the Drive should be made in much the same manner, and receive the same care for a precision gear reducer. Standard Drives are designed for horizontal operation only. (Vertical, ceiling and side wall installed units are available.) Note the following precautions when mounting the drive:

1. The Drive should be mounted on a firm, level base or foundation, common with both the driving and driven components.
2. Use SAE Grade 5 Hex Hd. Cap Screws to bolt the drive securely into place. Before tightening down the bolts, check alignment with both the driving and driven machinery, then recheck after tightening.
3. If the input or output shaft is to be directly coupled, use only a flexible coupling (with horsepower service factor 3 to 1) to take care of maximum torque requirements. Make sure that the shafts to be coupled are concentric within 0.005 in. TIR. Check for horizontal, vertical and angular misalignment. Use shims as necessary to correct.

#### CAUTION:

**Do not drive couplings or bushings on shaft.**

4. If the Drive is to be connected through a belt, chain or gear drive, locate as close as possible to the housing to minimize overhung loads. Make sure that the sheaves, sprockets or gears are in line and that the shafts are parallel.
5. After the machinery has been in operation for a few hours, make sure that all mounting bolts are tight and recheck the alignment of all components.
6. After machinery has been in operation for 40 hours check the mounting bolts and tighten if necessary.

### 3-3 COMPRESSED AIR CONNECTIONS

Figures 3.1, 3.2, 3.3 and 3.4 illustrate typical compressed air systems for the Posidyne drives:

See Publication #502-CV-001 for a complete Service Manual and Repair Parts for Pneumatic Control Valves and Accessories.

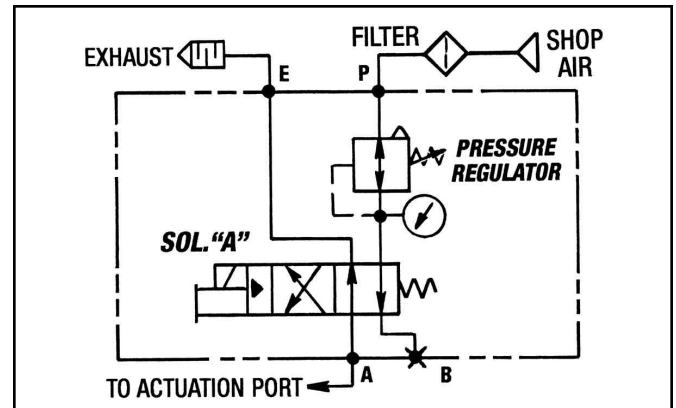


**Figure 3.1 - 1PC Control Valve with Sandwiched Regulator** - Air operated clutch, Spring-set Brake. (A, B and C Logics)

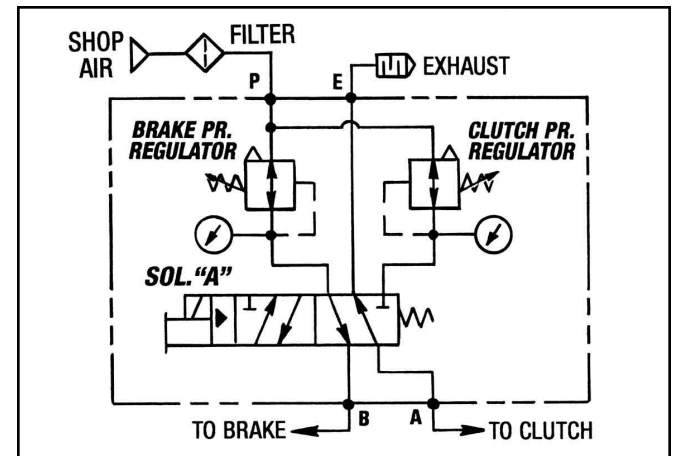


**Figure 3.2 - 2PC-3/8 Control Valve with Sandwiched Regulators** - Air operated clutch, Spring-set Brake with air assist. (S and SA Logics)

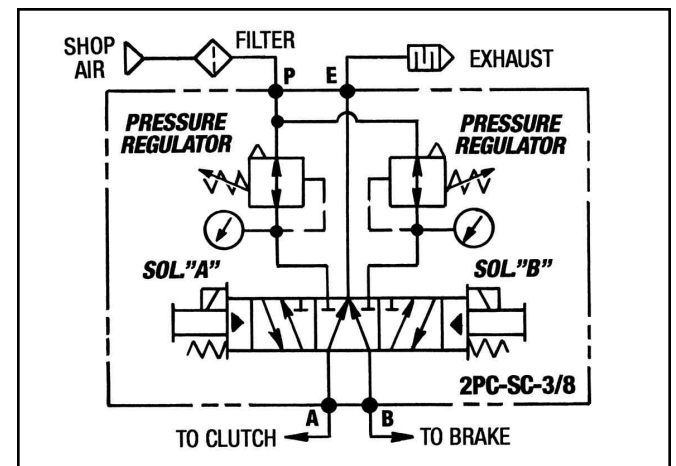


**Figure 3.3 - 2PC-SC-3/8 Control Valve with Sandwiched Regulators** - Spring Centered Piston, Air operated clutch and brake. (SCP Logic)

**Note the following when planning and installing the air system:**

1. Use direct acting solenoid air valves or pilot operated valves to give the response speed required. Locate the valves as close as possible to the air inlets on the drive. The valves may be installed directly on the drive if they are supported.
2. Be sure to use valves of at least 1.0 Min. Cv size.
3. The optional accumulators should be used for quick response, particularly if the air line loss and the nature of the air supply is such that recovery is slow. Accumulators can only be used in pneumatic systems where the pressure regulators are installed before the accumulators as shown in *Figure 3.4* for the 2PI-3/8 Control Valve. Size the accumulator to be at least 10 times the air required per engagement (**See Table 2.1**)
4. The air pressure regulator should be sized and set to provide the required torque. (**See Table 2.1**)
5. Pressure is directly proportional to torque. Use only the pressure necessary. (The clutch is not a variable speed drive. Do not let it slip for extended periods.) This will give additional life to the clutch-brake.
6. After using the drive for a few weeks the acceleration time may increase. Increasing the air pressure will restore the acceleration.

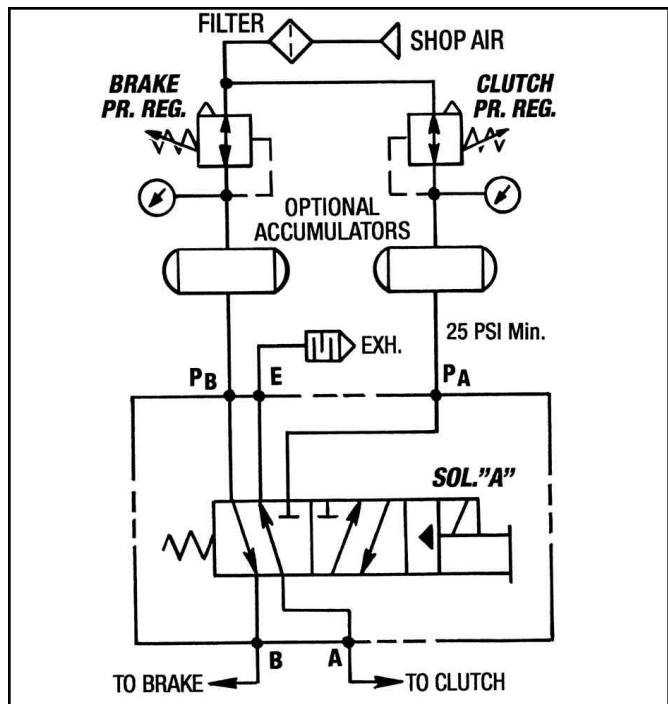


**Figure 3.4 - 2PI-3/8 Control Valve without Regulators** - Air operated clutch, Spring-set Brake with air assist. (S and SA Logics)

## Section 4 LUBRICATION

### 4-1 CHECKING THE OIL LEVEL

When the drive is installed and weekly thereafter, or until experience dictates otherwise, check the oil level. Always check the oil level with the drive at room temperature and while it is not running.

The drive has an oil sight gauge located at the output end of the drive. The oil level is to be at the center of the gauge.

### 4-2 OIL CAPACITY

The Oil Capacity for the 2.5 Posidyne is as follows:

Horizontal Installation - 3 Quarts

Vertical Installation - 4 Quarts

### 4-3 CHANGING THE OIL

#### IMPORTANT

Open the disconnects to the drive motors before attempting to change the oil.

Every three months completely drain the oil from the drive using the drain plugs provided. If the oil sight gauge is dirty, it should be removed and cleaned.

Reinstall the drain plugs and refill the drive to the center of the sight gauge with fresh oil.

#### CAUTION

**Do not overfill the Drive Unit. Excess oil will cause the unit to overheat.**

### 4-4 TYPE OF OIL

Use only Mobil Automatic Transmission Fluid ATF-210 (type "F") or Mobil Multi-purpose Automatic Transmission Fluid for most drives. Other fluids may be specified for special applications. Always use the type of fluid specified on the Name Plate.

#### CAUTION

**Use of the wrong type of oil will cause erratic operation, premature wear, damage to the unit and void the Warranty.**

## Section 5 OPERATIONAL CHECKS

These Operational Checks are to be made when the Drive Unit is removed from service for repair. Provisions for manually controlled 60 to 80 PSI air pressure must be made for these Operational Checks.

### 5-1 GENERAL SET-UP INSTRUCTIONS

Assemble a Pneumatic Testing Set-Up similar to the one shown in *Figure 5.1*

#### **(S, SA and SCP Logic Only) "Air Assist " to Brake**

5. Connect the Pneumatic Testing Setup to the Brake Port and apply shop air to it.
6. Repeat Steps 2, 3 and 4.

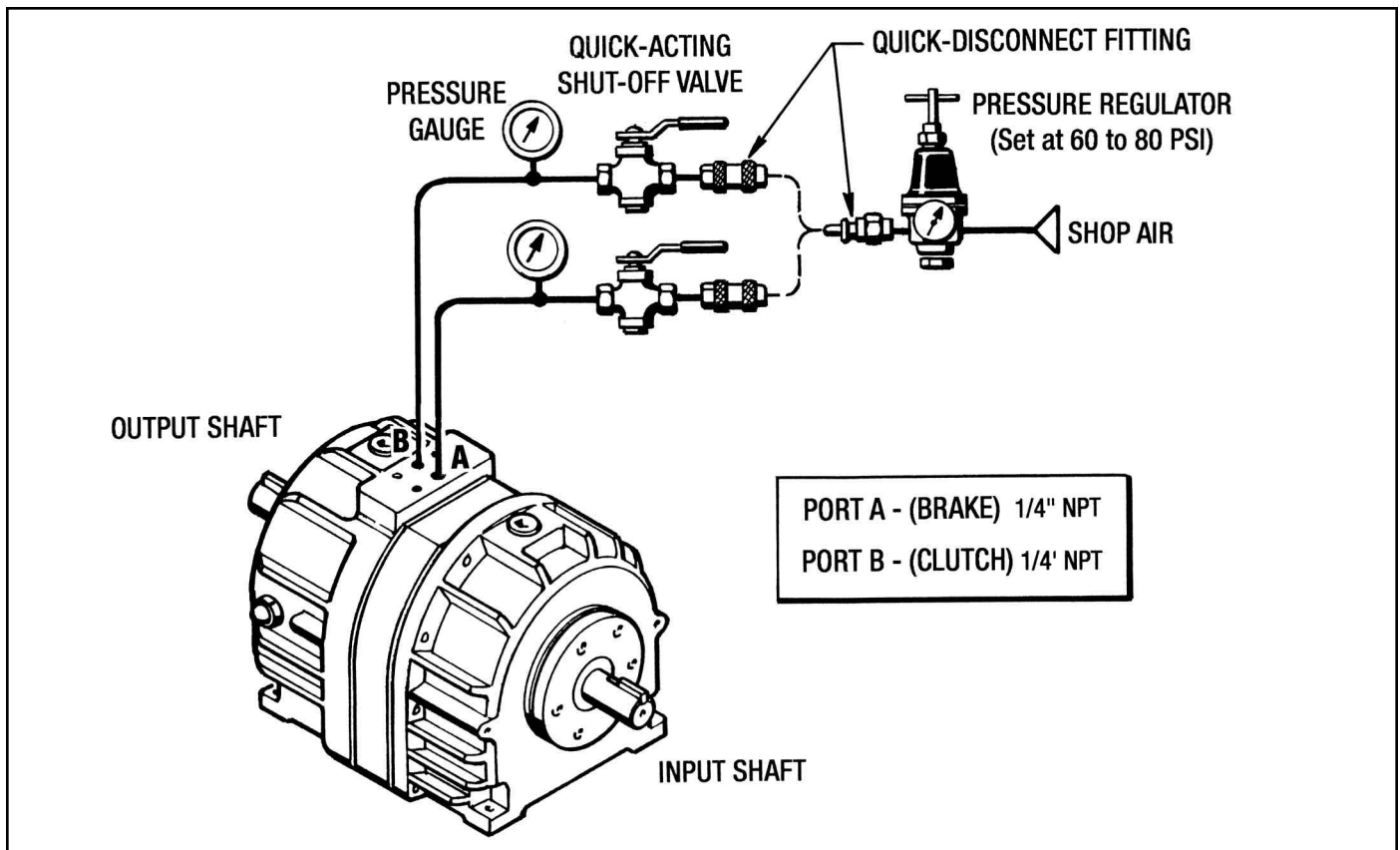


Figure 5.1 - Pneumatic Testing Set-Up for Operational Checks

### 5-2 CHECKING CLUTCH AND BRAKE PISTON SEALS

(See Figure 5.1)

1. Connect the Pneumatic Testing Setup to the Clutch Port and apply shop air to it.
2. Crack the Shut-off Valve until the air pressure reads about 80 PSI on the Pressure Gauge and then quickly shut the air off.
3. Observe the Pressure Gauge to see if the air pressure stays the same or drops. If the pressure stays the same or drops slowly, the Piston Seals are okay. If the pressure drops rapidly (more than 5 PSI in 5 seconds), the Piston Seals are leaking and will need to be replaced.
4. Disconnect the shop air and exhaust the air pressure from the drive unit.

### 5-3 CHECKING CLUTCH AND BRAKE ENGAGEMENT OR INPUT SHAFT Vs. OUTPUT SHAFT ROTATION.

#### **(WITH MALE INPUT SHAFTS)**

1. When applying air pressure to the Clutch Port, simply rotate the Input Shaft by hand and observe the rotation of the Output Shaft. Likewise, when the air pressure is not applied to the clutch port or when air pressure is applied to the "Air Assist" brake port, the Output Shaft should be locked in the braking position and should not rotate.

With SCP Logic the Output Shaft is free to rotate when air pressure is not applied to the Brake Port. Applying air to the Brake Port should lock the Output Shaft.

### **(With C-Face Mounted Drive Motor)**

If the C-Face mounted drive motor is still attached, then the input shaft is not accessible to be manually rotated to check the Clutch/Brake Stack Engagement and Input Shaft vs. Output Shaft Rotation.

1. Temporally hook-up the drive motor and "Bump" it to check the clutch or brake operating modes and the output shaft rotation.

#### **CAUTION**

**Do not attempt to run the motor with the inspection plugs (#14) removed. They must first be replaced.**

### **5-4 DRIVE MOTORS**

Check wiring connections against the wiring diagram on the Name Plate. "Bump" the motor and check direction of rotation. Check all connections for tightness.

### **5-5 PNEUMATIC CONTROL**

The Pneumatic Control Operational Checks are to be made with Pneumatic Control valves hooked up.

(See Figures 3.1, 3.2, 3.3 and 3.4 for appropriate Pneumatic Control Diagrams.)

1. Shut off air supply, lock it out, and bleed off any trapped air in the system.
2. Insert Diagnostic Pressure Gauges in the air supply between the control valves and the drive. Turn air supply back on.
3. Activate Solenoid Control Valves for desired function.
  - A. Clutch Drive.
  - B. Brake "Air Assist".
4. Check air pressure with installed diagnostic pressure gauges for each function.
5. Check all electrical connections and the solenoid operation per manufacturer's specifications. With SCP Logic the Output Shaft is free to rotate when air pressure is not applied to the "Brake Port". Applying air should lock the Output Shaft.

## **Section 6 TROUBLESHOOTING**

### **6-1 TROUBLESHOOTING CHART**

| <b>TROUBLE</b>                                 | <b>POSSIBLE CAUSE</b>             | <b>REMEDY</b>                                                    |
|------------------------------------------------|-----------------------------------|------------------------------------------------------------------|
| Both clutch and brake fail to engage properly. | Electrical control circuit.       | Check control circuit.                                           |
|                                                | Low air pressure.                 | Increase air pressure.**                                         |
|                                                | Air pressure regulator or piping. | Check for improper operation or leaks.                           |
|                                                | Worn friction surfaces.           | Check parts for wear and replace if necessary. (See Section 6-2) |
|                                                | Improper type of oil              | Check name plate and change oil if necessary.                    |
| Clutch fails to engage properly.               | Electrical control circuit.       | Check control circuit.                                           |
|                                                | Valve not functioning properly.   | Check valve operation. Replace if necessary.                     |
|                                                | Internal air leakage.             | Check and replace O-Rings and Liners if necessary.               |
|                                                | Low air pressure                  | Increase air pressure.**                                         |
|                                                | Worn friction surfaces.           | Check parts for wear and replace if necessary. (See Section 6-2) |

## 6-1 TROUBLESHOOTING CHART (Continued)

| TROUBLE                                       | POSSIBLE CAUSE                                                                                                                                                                             | REMEDY                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Picks up load too quickly.                    | Air pressure too high.<br>Low oil level.                                                                                                                                                   | Reduce air pressure.<br>Check oil level and add if necessary.                                                                                                                                                                                                                                                   |
| Clutch fails to disengage properly.           | Electrical control circuit.<br>Valve not functioning properly.<br>Piston sticking-broken return springs.                                                                                   | Check control circuit.<br>Check and replace valve if necessary.<br>Disassemble to extent necessary and inspect for damaged parts.                                                                                                                                                                               |
| Noise and vibration                           | Mounted on poor foundation.<br>Misaligned couplings.<br>Damaged bearings.                                                                                                                  | Improve installation. Tighten foot bolts.<br>Recheck alignment.<br>Disassemble to extent necessary and inspect for damaged bearings.                                                                                                                                                                            |
| Brake fails to engage properly.               | Electrical control circuit.<br>Valve not functioning properly.<br>Internal air leakage.<br>Low air pressure<br>Worn friction surfaces.<br>Piston sticking.<br>Weak or broken brake spring. | Check control circuit.<br>Check valve operation. Replace if necessary.<br>Check and replace O-Rings and Liners if necessary.<br>Increase air pressure.**<br>Check parts for wear and replace if necessary. (See Section 6-2)<br>Disassemble to extent necessary and check for damaged parts.<br>Replace spring. |
| Brake fails to disengage properly.            | Electrical control circuit.<br>Valve not functioning properly.<br>Piston sticking.                                                                                                         | Check control circuit.<br>Check and replace valve if necessary.<br>Disassemble to extent necessary and inspect for damaged parts.                                                                                                                                                                               |
| Drive overheats.<br>(Oil temp. above 225° F.) | Inertia or resistance changed.<br>Improper oil level.<br>Improper type of oil.<br>Water turned off.<br>Fan blocked.                                                                        | Check with Force Control engineering.<br>Check oil level. Add or drain as needed.<br>Check name plate and change oil if necessary.<br>Check shut-off valve.<br>Clean shroud.                                                                                                                                    |



## 6-1 TROUBLESHOOTING CHART (Concluded)

| TROUBLE                          | POSSIBLE CAUSE                 | REMEDY                                                                |
|----------------------------------|--------------------------------|-----------------------------------------------------------------------|
| Oil leakage                      | Oil seal lips damaged.         | Check to see if oil is leaking around shaft and replace if necessary. |
|                                  | Gaskets                        | Tighten all external bolts.                                           |
|                                  | Poor ventilation.              | Remove breather and clean.                                            |
|                                  | Seal retainers loose.          | Tighten retainer screws.                                              |
| Oil leakage out breather.        | Damaged seal around piston.    | Disassemble and repair.                                               |
|                                  | Oil level too high.            | Drain excess oil.                                                     |
| Excessive shaft end play.        | Bearings bad.                  | Disassemble and replace.                                              |
| Clutch or brake does not repeat. | Air pressure changed.          | Check air pressure and adjust.                                        |
|                                  | Improper type of oil.          | Check name plate and change oil if necessary.                         |
|                                  | *Oil temperature changed.      | Check temperature.                                                    |
|                                  | Resistance in machine changed. | Lubricate bearings.                                                   |

\* - For installations requiring precise starting and stopping, operating temperatures are important. Operating temperatures between 116°F and 165°F are recommended. If the oil is allowed to drop to ambient temperatures overnight, the clutch input shaft should be run approximately 1/2 hour before operating the machinery.

\*\* - Max. Air Pressure  
S, P & C Models: 60 PSIG; A & B Models: 80 PSIG; SA Models: 80 PSIG Clutch & 40 PSIG Brake ; SCP Models: 60 PSIG

Zinc anode On all water cooled drives, a brass plug containing a zinc anode is installed in the water line close to one of the water connection ports. **DO NOT REMOVE IT.** The zinc anode is installed to prevent electrolysis damage to the oil cooler. Water supply should enter the oil cooler at the port nearest the zinc anode. The zinc anode should be checked occasionally and replaced before it is completely eroded.



## 6-2 CHECKING THE CLUTCH AND BRAKE STACKS FOR WEAR

### (A, B and SA ; S , P and SCP Logics Only)

An easy procedure has been established to visually check the Brake and Clutch Stacks for Wear to determine whether or not they need to be replaced.

Four (4) "Stack Wear" Grooves have been machined in the Brake Pressure Plate (#97) Lugs to facilitate this visual check. Depending on which Logic applies to your unit, only (2) of them are used. (See Figure 6.1)

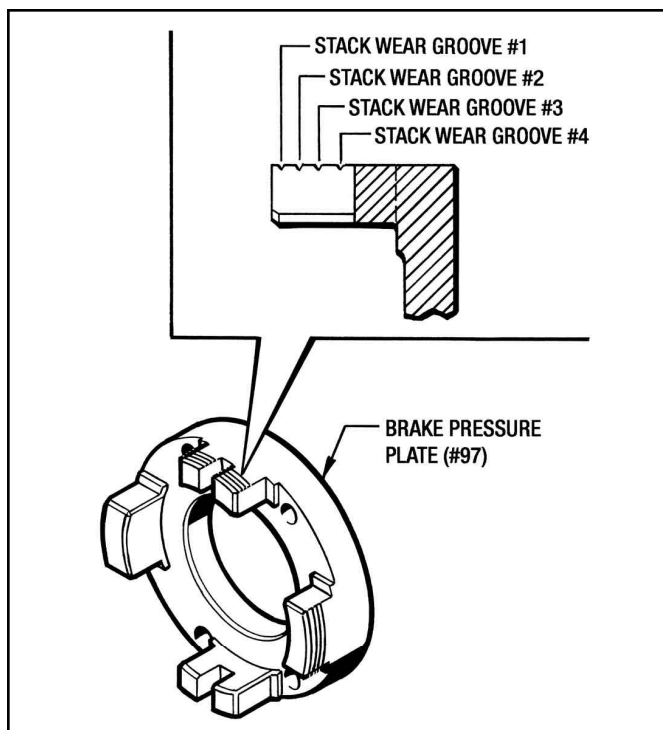


Figure 6.1 - "Stack Wear" Grooves

#### CAUTION

**Disconnect and lock-out all Electrical Power to the Drive Motor. This step must be taken to avoid any possibility of personal injury or damage to the Drive Unit.**

1. Remove the Inspection Pipe Plug (#14) from the top of the Output Housing (#9).

#### A. CLUTCH STACK WEAR (See Figure 6.2)

2. Apply air pressure to the Clutch Port.
3. Using a flash light, observe the Brake Stack through the Inspection Port.

#### (A, B and SA Logics)

If Surface "A" of the last Drive Plate has moved up to or past the "Stack Wear" Groove (#1), the Clutch Stack needs to be replaced.

#### (S , P and SCP Logics)

If Surface "A" of the last Drive Plate has moved up to or past

the "Stack Wear" Groove (#2), the Clutch Stack needs to be replaced.

4. Exhaust the air pressure from the Clutch Port.

#### B. BRAKE STACK WEAR (See Figure 6.2)

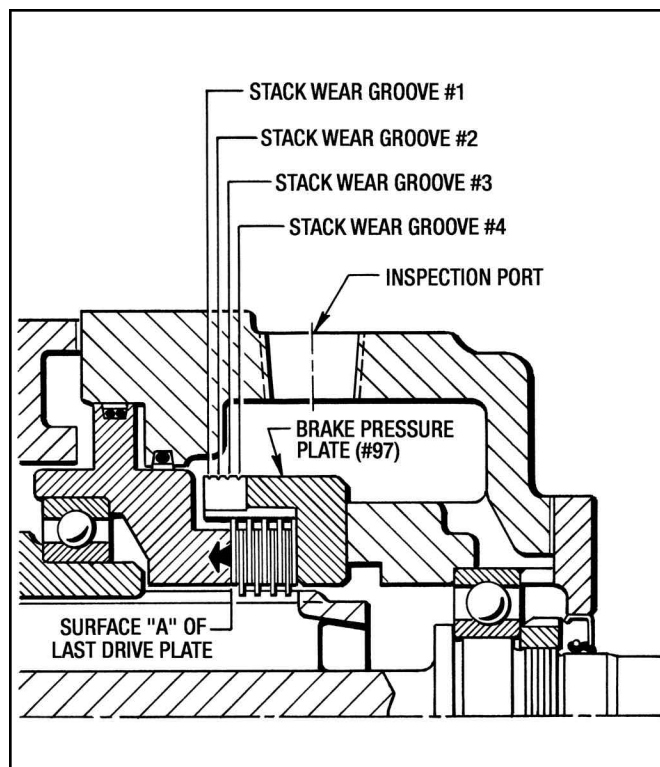


Figure 6.2 - Checking Clutch and Brake Stacks for Wear

5. Apply air pressure to the Brake Port.

#### NOTE:

This Step #5 only applies to S, P, SCP and SA Logics. There is no Brake Port for A and B Logics.

6. Using a flash light observe the Brake Stack through the Inspection Port.

#### (A, B and SA Logics)

If Surface "A" of the last Drive Plate has moved up to or past the "Stack Wear" Groove (#3), the Brake Stack is worn and needs to be replaced.

#### (S , P and SCP Logics)

If Surface "A" of the last Drive Plate has moved up to or past the "Stack Wear" Groove (#4), the Brake Stack is worn and needs to be replaced.

#### IMPORTANT NOTE:

Even though both the Brake Stack and the Clutch Stack can individually be checked for wear. If either Stack is worn and needs to be replaced, both Stacks should be replaced as a complete set. Refer to Section 7 - DISASSEMBLY and Section 9 - REASSEMBLY for Brake and Clutch Stack Replacement.

## Section 7 DISASSEMBLY

### 7-1 GENERAL DISASSEMBLY PROCEDURE

1. Disconnect the Drive and move it to a suitable work area.

#### NOTES:

1. On Belt Driven or Direct Coupled Units, remove all necessary safety guards, belts, sheaves and couplings
  2. For Water Cooled Units, disconnect water inlet and outlet piping. Drain water from the unit.
  3. Disconnect all necessary pneumatic piping.
2. Remove drain plugs at the bottom of the Drive Unit and drain out all of the oil into suitable container and either save for reuse or discard as conditions warrants.

#### NOTES:

1. We recommend that you set the Drive Unit on the Output End with the Output Shaft in a vertical down position, for ease of disassembly. Supply suitable bracing and clamping to stabilize the Drive Unit for Disassembly.
2. An overhead crane and a soft sling is also recommended, if necessary, to remove heavy castings and parts.

The 2.5 Posidyne Clutch/ Brake Unit is comprised of the Input Housing Sub-Assembly and the General Overall Assembly which includes the Clutch Stacks, Piston Retainer, Piston, Brake Stack, Output Housing and Output Shaft.

Optional equipment is also covered in this manual. They are as follows: (1) Position Encoder Assemblies; (2) Manifold Mounted Control Valve; (3) Fan Cooling and Water Cooling; (4) Input and Output C-Face Flanges; (5) Piggyback Mounting; (6) Vertical Installation.

The Repair Parts Lists and Exploded View Drawings shown in Section 10 are for all Standard and Optional Equipment. They are as follows:

1. 2.5 Posidyne Clutch/Brake Assembly.....(Figure 10.1)
2. Output C-Face Adapter (8-1/2" AK) .....(Figure 10.2)
3. Input Housing Sub-Assembly .....(Figure 10.3)
4. Open Collector Quadrature Encoder .....(Figure 10.4)
5. Differential Line Driver Encoder.....(Figure 10.4)
6. Manifold Mounted Control Valve.....(Figure 10.5)
7. Fan Cooling and Water Cooling .....(Figure 10.6)
8. Piggyback Mounting .....(Figure 10.7)
9. Vertical Installation.....(Figure 10.8)

Please refer to these Parts Lists and Exploded View Drawings during the Disassembly Procedure for a visual reference and guide to all parts being disassembled.

### 7-2 REMOVING C-FACE MOUNTED DRIVE MOTOR and C-FACE FLANGES

#### (With Quill Input Shaft Only)

(See Figure 10.3)

1. Attach an appropriate sling and hoist to the Input Drive Motor for support and removal.
2. Remove (4) Hex Hd. Screws (#415) and (4) Lockwashers (#416) from the C-Face Adapter (#200).
3. Slide the motor shaft out of the Quill Input Shaft (#2).
4. Remove the (4) Soc. Hd. Screws (#201) and (4) Lockwashers (#202) from the C-Face Adapter (#200).
5. Pull the C-Face Adapter (#200) off of the Input Housing.

#### (With 8-1/2" AK Output C-Face Adapter)

(See Figure 10.2)

1. Remove the (4) Screws (#204) and the (4) Lockwashers (#205) from the C-Face Adapter (#203).
2. Pull the C-Face Adapter (#203) off of the Output Housing.

### 7-3 REMOVING FAN SHROUD and FAN

(See Figure 10.6)

1. Remove the (2) Screws (#66) from the rear of the Fan Shroud (#24) and remove the Fan Shroud from the Input Housing.
2. Loosen the (2) Set Screws (#70) and pull the Fan (#25) off the Input Shaft (#2).
3. Remove both Keys (#37) and (#180) from the Input Shaft.

### 7-4 REMOVING QUADRATURE ENCODER

(See Figure 10.4)

1. If the 5-Pin Brad Harrison Cable (#259) is still attached, disconnect it at this time.
2. Take the Housing Cover (#253) off by removing (4) Screws (#268).
3. Remove the (4) Screws (#76) and (4) Lockwashers (#257) from the Pick-Up Housing (#17) and pull the housing off the Output Housing.
4. Loosen the Set Screw (#154) and pull the Pulse Gear (#186) off of the Output Shaft (#1).
5. Remove both keys (#181) and (#234) from the Output Shaft.

### 7-5 REMOVAL OF QUADRATURE SENSOR (#355) and MAGNETIC PICK-UP (#22)

#### (Quadrature Encoder Only)

(See Figure 10.4)

#### NOTE:

The Quadrature Encoder Assembly does not have to be removed from the Output Housing to replace the Sensors.

1. Remove the (4) Screws (#225) and take the Top Cover (#372) off the Pick-Up Housing (#17).

2. Disconnect the wires from the Brad Harrison Cable Connector (#368) to both Sensors.
3. Loosen the Set Screw (#241) and pull the Magnetic Pick-Up (#22) out of the housing. (Do not remove this set screw.)
4. Remove the (2) Screws (#226) and lift the Quadrature Sensor (#355) out of the housing.
5. If any Shims (#900 to 903) are under this Sensor, remove them and save for Reassembly.

## 7-6 REMOVAL and DISASSEMBLY of DIFFERENTIAL LINE DRIVER ENCODER (Optical Encoder)

(See Figure 10.4)

Any Drive Sheaves, Pulleys or Couplings must first be removed from the output shaft.

1. Take out the (4) Screws (#225) and remove the Top Cover (#372) and the upper Gasket (#19) from the Upper Enclosure (#18). This gasket is reusable.
2. Pull the Insulator (#373) up and out of the Upper Enclosure (#18).
3. Loosen the (2) captive screws in the Cable Connector (#368) and unplug it from the Circuit Board (#355). (See Figure 7.1)

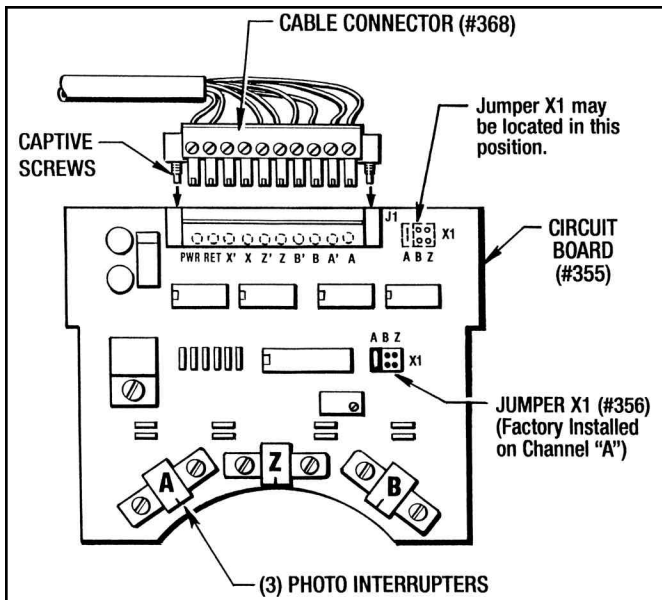


Figure 7.1 - Circuit Board Connector

4. Pull the Cable Grommet (#260), Cable (#259) and Cable Connector (#368) out of the Top Enclosure slot.
5. Remove the (2) Cap Screws (#77) and take the Upper Enclosure (#18) and lower Gasket (#19) off of the Disc Housing (#17). This gasket is also reusable.
6. Pull the Circuit Board (#355) straight up and out of the Disc Housing (#17).
7. Remove the (4) Screws (#76) and pull the Disc Housing off the Posidyne mounting face.

## CAUTION

Be very careful not to bump or bend the Optical Disc (#186) which is still attached to the output shaft or damage the Dirt Seal (#269) located in the Disc Housing (#17).

8. If the Posidyne still has the main driving key in the output shaft, remove it at this time.
9. Loosen the Set Screw (#154) and pull the Optical Disc Assembly (#186) off of the output shaft.
10. Remove the Key (#234) then the Spacer (#270) from the output shaft.
11. Check the Dirt Seal (#269) in the Disc Housing (#17) and remove it if necessary.

## 7-7 REMOVING MANIFOLD MOUNTED CONTROL VALVE

(See Figure 10.5)

1. Disconnect the Air Hoses and the 4-Pin Brad Harrison Cable.
2. Unscrew (2) Screws (#725) and lift the Control Valve (#700) off the Manifold (#701).
3. Check the (2) Seal Rings (#808) and replace if necessary.
4. Remove the Manifold by taking out the (4) Screws (#730) and (4) Washers (#740).
5. Remove Gasket (#807) and discard.

## 7-8 REMOVING PIGGYBACK DRIVE MOTOR, BELT GUARD and MOUNTING BRACKETS

(See Figure 10.7)

1. Remove the top and front sections of the Belt Guard (#124).
2. Loosen the belt tension by backing-off the (4) top Jam Nuts (#152). Remove the Timing Belt from the Pulleys.
3. Unscrew the (4) motor hold-down bolts and with an over-head hoist remove the Drive Motor.
4. Take the Pulley off the Posidyne Input Shaft. (See Figure 7.2 for procedure.)

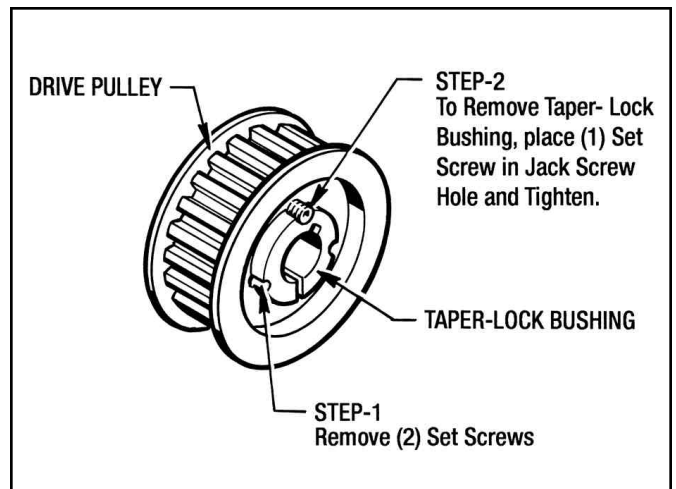


Figure 7.2 - Removing Drive Pulley

5. The lower back plate of the Belt Guard can now be removed by removing Screws (#305) and (#268).
6. Remove all other motor mounting brackets and mounting hardware necessary for further Disassembly.

## 7-9 ACCESS TO THE CLUTCH and BRAKE STACKS

(See Figure 10.1)

### IMPORTANT NOTE:

When removing the Clutch and Brake Stacks, always keep the Drive Plates and Friction Discs in the same order as they were removed.

### A. Clutch Stack

1. Remove the (10) Screws (#69) and the (10) Lockwashers (#127) from the Output Housing (#9).
2. Using the (2) jackscrew holes in the Input Housing (#8), separate the Input Housing from the Piston Retainer (#11).
3. Remove and discard Gasket (#53).

The Clutch Stack can now be removed from the Output Shaft Spline.

### B. Brake Stack

4. **Evenly loosen** the (4) Screws (#62) in the Piston Retainer (#11). (**Do not remove them at this time.**) Using the (2) jackscrew holes, separate the Piston Retainer (#11) from the Output Housing (#9).

### CAUTION:

**This Piston Retainer is under spring pressure and care must be taken to avoid personal injury when removing this Piston Retainer.**

5. **Evenly remove** the (4) Screws (#62) and the (4) Lockwashers (#128) and remove the Piston Retainer (#11), being careful not to damage the Teflon Liner (#42) in the Piston Retainer.
6. Take the (5) Springs (#36) out of the Piston Retainer. Make a free hand sketch of spring locations. This will help at Reassembly.
7. Remove and discard Gasket (#51).
8. Pull the Piston Sub-Assembly out of the Output Housing, being careful not to damage the Teflon Liner (#43) in the Piston (#3).
9. On **SCPLogic**, there are (5) more Springs (#36) located in the Output Housing. Remove them at this time. Make a free hand sketch of Spring Locations.

The Brake Stack can now be removed from the Output Shaft Spline.

If replacement of the Clutch and Brake Stacks is the only repair to be done, then proceed to Section 8 CLEANING and INSPECTION.

## 7-10 REMOVING PISTON SEALS

(Teflon Liners and O-Rings)

(See Figure 10.1)

It is recommended that all Liners and O-Rings that are removed at Disassembly should be replaced with new ones at Reassembly.

1. Remove the Teflon Liner (#42) and O-Ring (#39) from the Output Housing (#9) and discard, if necessary.
2. Remove the Teflon Liner (#42) and O-Ring (#39) from the Piston Retainer (#11) and discard, if necessary.
3. Remove the Teflon Liner (#43) and (2) O-Rings (#40) from the Piston (#3) and discard, if necessary.

## 7-11 PISTON DISASSEMBLY

(See Figures 7.3 and 10.1)

### IMPORTANT

Only disassemble this Piston if either the Thrust Plate (#5) or Bearing (#27) needs to be replaced.

1. Press the Thrust Plate (#5) and the Bearing (#27) out of the Piston (#3) with an arbor press as shown in Figure 7.3.

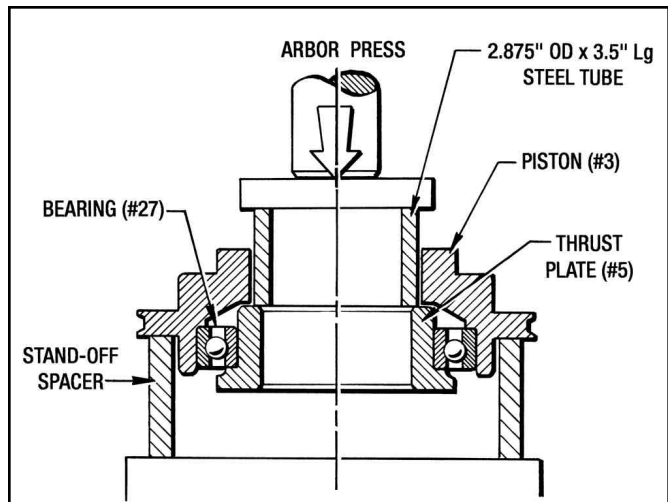


Figure 7.3 - Piston Disassembly

## 7-12 OUTPUT HOUSING DISASSEMBLY

(See Figure 10.1)

1. If the Key (#181) is still in the Output Shaft, remove it at this time.
2. Remove the Bearing Retainer (#7) by taking out (6) Screws (#63). Pull the Bearing Retainer off and over the Output Shaft, being careful not to damage the lip of Oil Seal (#31).
3. Check the Oil Seal (#31) and if it needs replaced, press it out of the Bearing Retainer (#7) with an arbor press.
4. Remove and discard Gasket (#55).
5. If necessary, remove the Brake Pressure Plate (#97) by taking out (4) Screws (#64).
6. With a mallet, tap the Output Shaft out of the Output Housing as shown in Figure 7.4.

### IMPORTANT

**Do not attempt to remove the Output Shaft unless Bearings (#28) and (#35) are damaged and have to be replaced.**

7. Heat up the Locknut (#34) and remove it from the Output Shaft. (Also clamp the Output Shaft in a vise to make the disassembly easier.
8. With a bearing splitter or puller, remove Bearings (#28) and (#35).

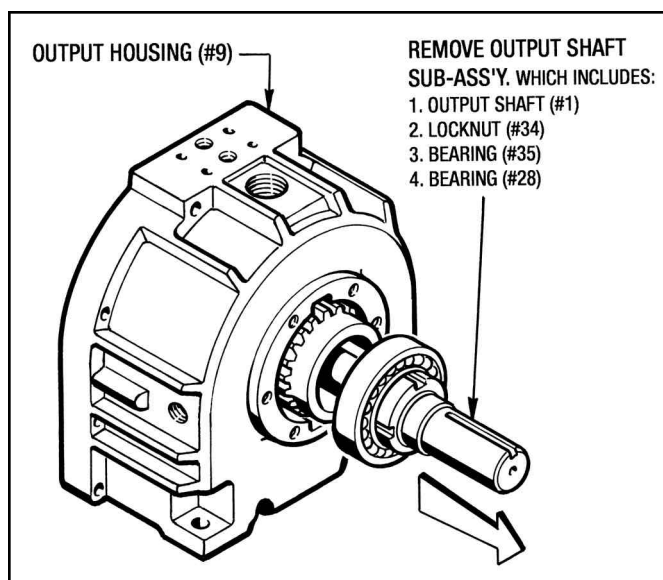


Figure 7.4 - Removing Output Shaft

## 7-13 DISASSEMBLY OF INPUT HOUSING SUB-ASSEMBLY

(See Figure 10.3)

### A. Removing Water Cooled Heat Exchanger

(See Figure 10.6)

#### NOTES:

1. Only remove the Heat Exchanger (#48) if replacement or repair is required.
2. It will be necessary to use a suitable punch to drive the tube ends out of the Input Housing. Care must be taken not to damage external machined surfaces.

1. Remove all external fittings from the Input Housing.
2. Remove (2) Screws (#56).
3. Tap out the tube ends, with a suitable punch, from the Housing (#8) and remove the Heat Exchanger (#48).

### B. Removing Male Input Shaft

#### IMPORTANT

**Do not attempt to remove the Input Shaft unless Bearings (#26) and (#38) are damaged and have to be replaced.**

1. If the Key (#180) is still intact in the Input Shaft (#2), remove it at this time.
2. Remove (6) Screws (#63) and remove the Bearing Retainer (#7) taking care not to damage the lip of the Oil Seal (#31).
3. Check Oil Seal (#31) and replace if necessary. If replacement is necessary, use an arbor press to press it out of the Bearing Retainer (#7).
4. Remove and discard Gasket (#55).
5. Take the Locknut (#34) off the Input Shaft.
6. Place the Input Housing (#8) into an arbor press with the Input Shaft pointing up. Use appropriate spacers under the housing. Press the Input Shaft (#2) down and out of the housing.

7.1 Lift the Bearing (#26) out of the bearing bore.

8. Use a Bearing Splitter to remove Bearing (#38) from the Input Shaft. (See Figure 7.5)

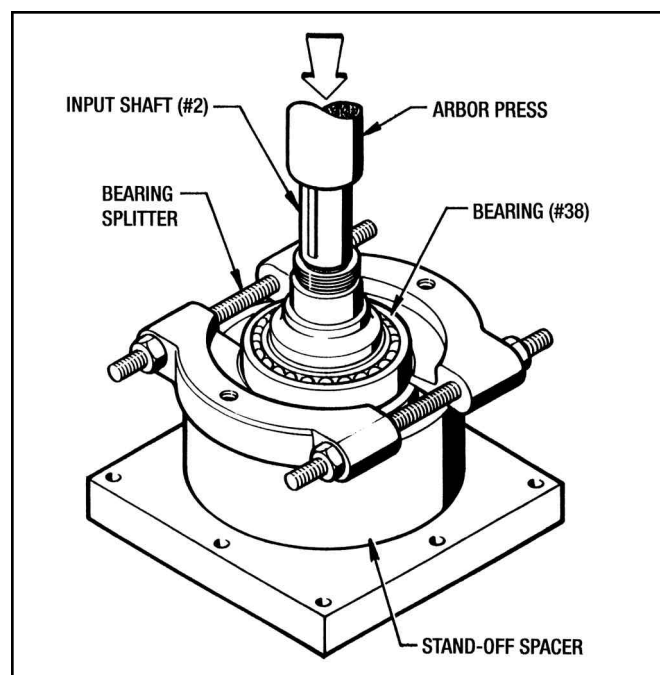


Figure 7.5 - Removing Bearing From Input Shaft

### C. Removing Quill Input Shaft

#### IMPORTANT

**Do not attempt to remove the Input Shaft unless Bearings (#26) and (#38) are damaged and have to be replaced.**

1. If the Key (#180) is still intact in the Input Shaft (#2), remove it at this time.
2. Remove (6) Screws (#110) and remove the Bearing Retainer (#207) taking care not to damage the lip of the Oil Seal (#208).
3. Check Oil Seal (#208) and replace if necessary. If replacement is necessary, use an arbor press to press it out of the Bearing Retainer (#207).
4. Remove and discard Gasket (#206).
5. Take the Locknut (#209) off the Input Shaft.
6. Place the Input Housing (#8) into an arbor press with the Input Shaft pointing up. Use appropriate spacers under the housing. Press the Input Shaft (#2) down and out of the housing.
7. Lift the Bearing (#26) out of the bearing bore.
8. Use a Bearing Splitter to remove Bearing (#38) from the Input Shaft. (See Figure 7.5)

**Disassembly is now complete for your  
2.5 Posidyne Clutch/ Brake Unit**

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## Section 8

### CLEANING and INSPECTION

#### 8-1 CLEANING AND INSPECTION

Clean metal parts in a suitable solvent and dry in a stream of low pressure compressed air. The Clutch and Brake Drive Plates (#13) can be cleaned in a solvent, but DO NOT clean the Clutch and Brake Friction Discs (#12) in solvent. Use only a clean, dry and lint-free rag to clean these Friction Discs. (Solvent will damage the resilient paper-based friction material used on the Friction Discs). Keep the Drive Plates and Friction Discs in the same order as they were removed. After cleaning, inspect parts for cracks, distortion, scoring, nicks, burrs or other damage would affect serviceability. Pay particular attention to the following:

1. Check the disc wear surfaces for scoring, galling or evidence of uneven wear.
2. Check the clutch and brake plates for scoring or galling. Make sure they are flat. If a perceptible ridge is worn in any of the drive plates, replace all of the drive plates and friction discs as a complete set.
3. Carefully check the piston and bore surfaces for nicks, scratches, scoring or other damage which would affect operation or cause leakage.

4. Pay particular attention to shafts in the area of rotary seals. Check for nicks, scratches which would cause leakage. Replace any damaged parts.
5. It is not necessary to remove the ball bearings to check their operation. Slowly rotate the free race of each bearing by hand checking to see if it turns freely without rough or flat spots.

#### 8-2 REPAIR AND REPLACEMENT

A fine stone or crocus cloth may be used to remove minor surface defects from parts so long as the operating or sealing action of the part is not affected. The use of coarser abrasive or other machining methods should not be attempted. Otherwise, damaged parts should be replaced.

Replacement is recommended also for the following, as applicable:

1. Replace all O-Rings, Liners, Gaskets and Oil Seals removed during the course of disassembly.
2. Replace Clutch or Brake Discs and Drive Plates in complete sets only.

## Section 9 REASSEMBLY

### 9-1 GENERAL REASSEMBLY INSTRUCTIONS

1. Lubricate O-Rings and the lips of all the Oil Seals with the same oil as used in the Drive Unit immediately before Reassembly and Installation of any mating parts.
2. O-Ring Liners (#43) will be easier to install if heated in a oven to 250° F. maximum.

The installation of press fitted parts can be eased by heating the outside parts in a oven. Heat Bearings to 250° F. maximum. **Always wear suitable gloves when handling heated parts.**

3. Apply Gasket Sealant (**Permatex #3D**), or equivalent, to all flat gaskets except where otherwise noted.
4. Use Cap Screw Adhesive (**Loctite #271**), or equivalent, on all Cap Screws and Locknuts. Use sparingly and clean off any excess with (**Loctite (#755)** Adhesive Cleaner.
5. Unless otherwise specified, torque all bolts to SAE Grade 5 specifications.

**Basically the Reassembly is just a reverse order of the Disassembly Procedure described in Section 7.**

### 9-2 REASSEMBLY OF INPUT HOUSING SUB-ASSEMBLY

(See Figure 10.3)

#### A. Installing Male Input Shaft

1. Press Bearing (#38) onto the Input Shaft (#2) with an arbor press.
2. Insert the Input Shaft (#2) with the Bearing (#38) on it into the rear of the Input Housing (#8) until the Bearing (#38) seats in the bearing bore.

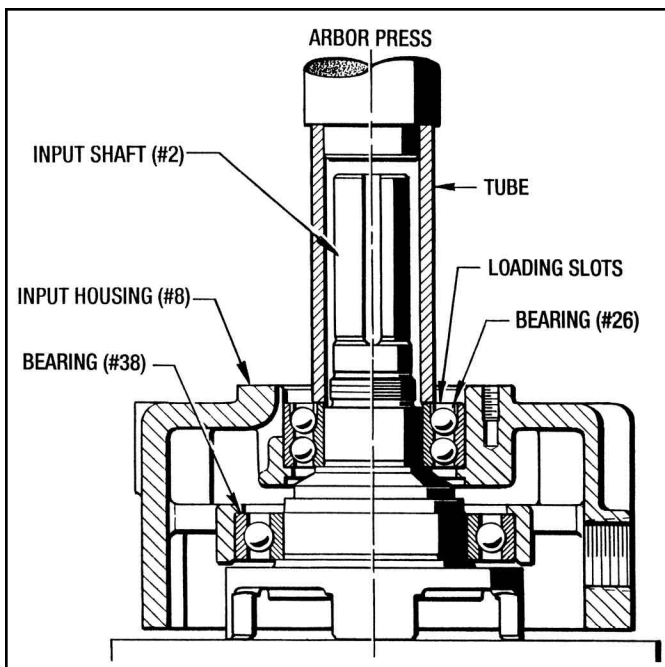


Figure 9.1 - Installing Male Input Shaft

3. Set the Input Housing into an arbor press as shown in Figure 9.1. Place the Bearing (#26) onto the Input Shaft and with an appropriate sized tube, press on the inner race of the bearing until it bottoms out. (Do not press on the bearing cage of the outer race.)
4. Install Locknut (#34) onto the Input Shaft (#2). Use Thread-Locker (Loctite #271) on the threads. **Wipe off any excess.**
5. Apply a thin coat of Sealant (Permatex #3D) to the oil seal bore in the Bearing Retainer (#7) and press the Oil Seal (#31) into the bore.
6. Place the Gasket (#55) onto the Bearing Retainer (#7), aligning the screw holes up. **(Do not use any gasket sealant on this gasket.)**
7. Place masking tape over the keyway and slide the Bearing Retainer (#7) with the Gasket (#55) over the shaft, being careful not to damage the lip of the Oil Seal (#31). Attach with (6) Screws (#63). **Torque to 9 Ft. Lbs.**
8. Replace Key (#180) back into the Input Shaft.

#### B. Installing Quill Input Shaft

1. Press Bearing (#38) onto the Input Shaft (#2) with an arbor press.
2. Insert the Input Shaft (#2) with the Bearing (#38) on it into the rear of the Input Housing (#8) until the Bearing (#38) seats in the bearing bore.
3. Set the Input Housing into an arbor press as shown in Figure 9.2. Place the Bearing (#26) onto the Input Shaft and with an appropriate sized tube, press on the inner race of the bearing until it bottoms out. **(Do not press on the bearing cage of the outer race.)**

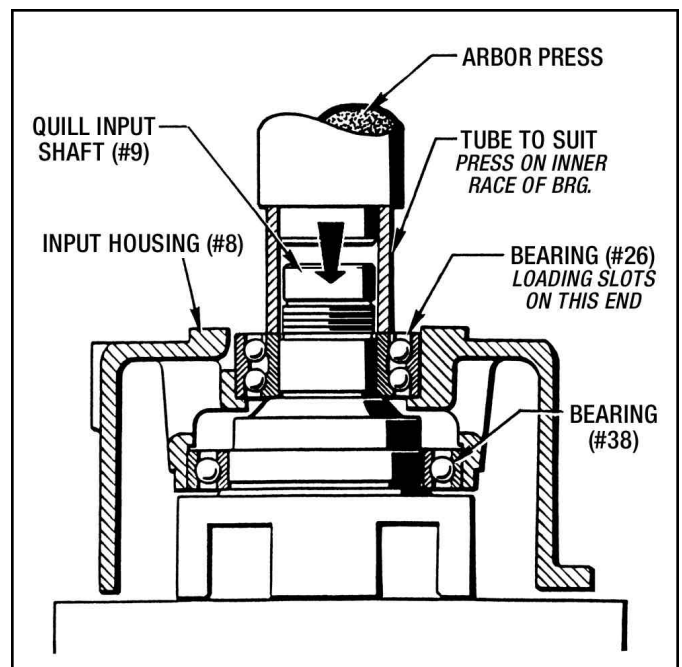


Figure 9.2 - Installing Quill Input Shaft

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4. Install Locknut (#209) onto the Input Shaft (#2). Use Thread-Locker (**Loctite #271**) on the threads. **Wipe off any excess.**
5. Apply a thin coat of Sealant (Permatex #3D) to the oil seal bore in the Bearing Retainer (#207) and press the Oil Seal (#208) into the bore.
6. Place the Gasket (#206) onto the Bearing Retainer (#207), aligning the screw holes up. **(Do not use any gasket sealant on this gasket.)**
7. Slide the Bearing Retainer (#207) with the Gasket (#206) over the shaft, being careful not to damage the lip of the Oil Seal (#208). Attach with (6) Screws (#210). **Torque to 14 Ft. Lbs.**
8. Replace Key (#180) back into the Input Shaft.

### 9-3 INSTALLING WATER COOLED HEAT EXCHANGER

(See Figure 10.6)

1. Guide the Heat Exchanger (#48) into the Input Housing, making sure that the tube ends project out the (2) holes in the rear face of the Housing. Attach with (2) Screws (#56).
2. Mark the tubing approximately 1/16" beyond the face of the housing. (See Figure 9.3).
3. Remove the Heat Exchanger from the Housing and cut off the tubes on the 1/16" marks. **NOTE-The ends of the tubes must be free of all burrs before reassembly.**

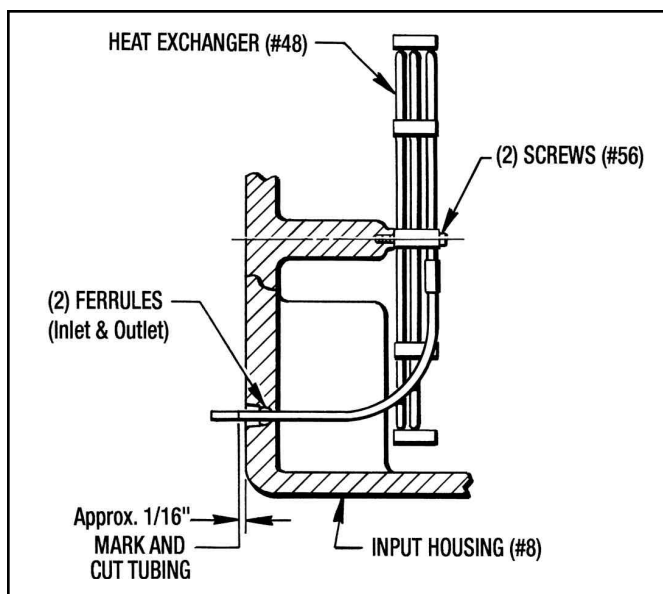


Figure 9.3 - Installing Water Cooled Heat Exchanger

4. Reinstall the Heat Exchanger back into the Housing. Apply **Loctite #271** to the tubing O.D. Then place the (2) Compression Fittings with Ferrules (#71) on the tubing. (See Figure 9.3).

#### IMPORTANT

**When tightening Fittings (#71), do not over tighten and then back off. This will cause the compression seal to leak.**

5. Install all external pipe fittings shown on Figure 10.6.

### 9-4 OUTPUT HOUSING INSTALLATION

(See Figure 10.1)

1. Install both Bearings (#28) and (#35) onto the Output Shaft (#1) with an arbor press.
2. Next install the Locknut (#34) onto the Output Shaft. Use (**Loctite #271**) on the threads. **Wipe off any excess.**
3. Press the Oil Seal (#31) into the Bearing Retainer (#7) Use a light coat of (Permatex #3D) on the O.D. of the oil seal. Wipe off any excess.
4. Insert the Output Shaft with the (2) Bearings on it into the Output Housing (#9) until Bearing (#35) seats into the bearing bore. (See Figure 9.4)

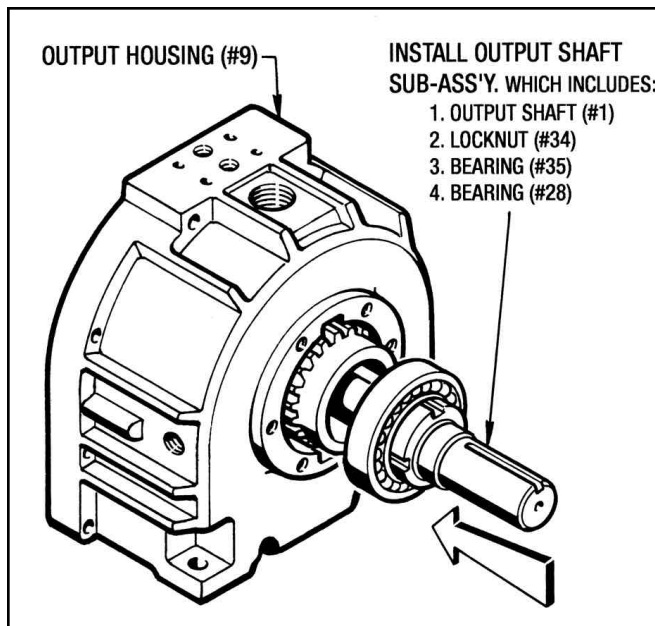


Figure 9.4 - Installing Output Shaft

5. Place gasket (#55) onto the Bearing Retainer (#7), aligning the holes in the gasket with the holes in the bearing retainer. **Do not use any Gasket Sealant on this gasket.**
6. Slide the Bearing Retainer (#7), Gasket (#55) and Oil Seal (#31) over the Output Shaft (#1). **Be careful not to damage the oil seal lip on the shaft keyway.** Attach with (4) Screws (#63). **Torque to 9 Ft. Lbs.**
7. For ease of installation, place the Output Housing in a vertical position with the splined end of the Output Shaft pointing up.
8. Slide the Brake Pressure Plate (#97) down and over the Output Shaft spline and attach it to the inside of the Output Housing with (4) Screws (#64). **Torque to 14 Ft. Lbs.**

### 9-5 INSTALLING BRAKE STACK

(See Figure 10.1)

#### A. Horizontal Installation

(See Figure 9.5)

**See Section 9-18 for Measuring and Controlling Stack Height Dimensions.**

1. Install the Brake Stack onto the Output Shaft Spline (#1) and Brake Pressure Plate (#97). Start with a Drive Plate (#13) then a Friction Disc (#12), ending with a Drive Plate (#13).

Align the notches in the Drive Plate (#13) with the lugs on the Brake Pressure Plate (#97) and the internal teeth in the Friction Discs (#12) with the splined teeth on the Output Shaft (#1). (See Figure 9.5 for Quantities needed for different Logics.)

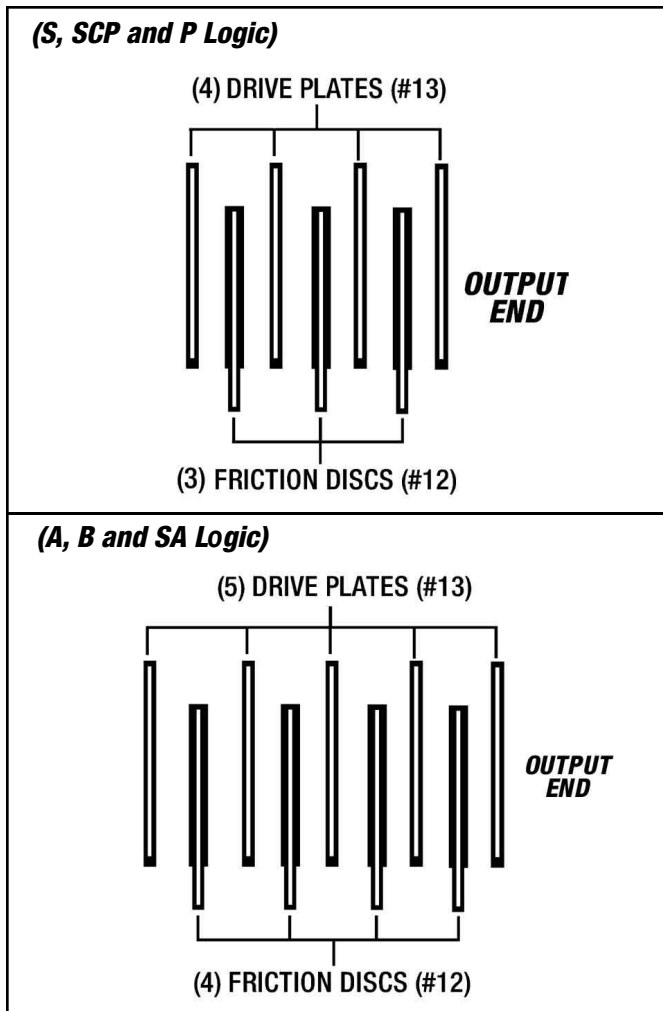


Figure 9.5 - Brake Stack (Horizontal Installation)

## B. Vertical Installation

(See Figure 9.6)

1. Install the Brake Stack onto the Output Shaft Spline (#1) and Brake Pressure Plate (#97). Start with a Drive Plate (#13), then a Friction Disc (#12), then a Drive Plate (#323) with (4) Separator Springs (#349) ending with a Drive Plate (#323) also with (4) Separator Springs (#349).

Align the notches in the Drive Plates (#13) and (#323) with the lugs on the Brake Pressure Plate (#97) and the internal teeth in the Friction Discs (#12) with the splined teeth on the Output Shaft (#1). (See Figure 9.6 for Quantities needed for different Logics.)

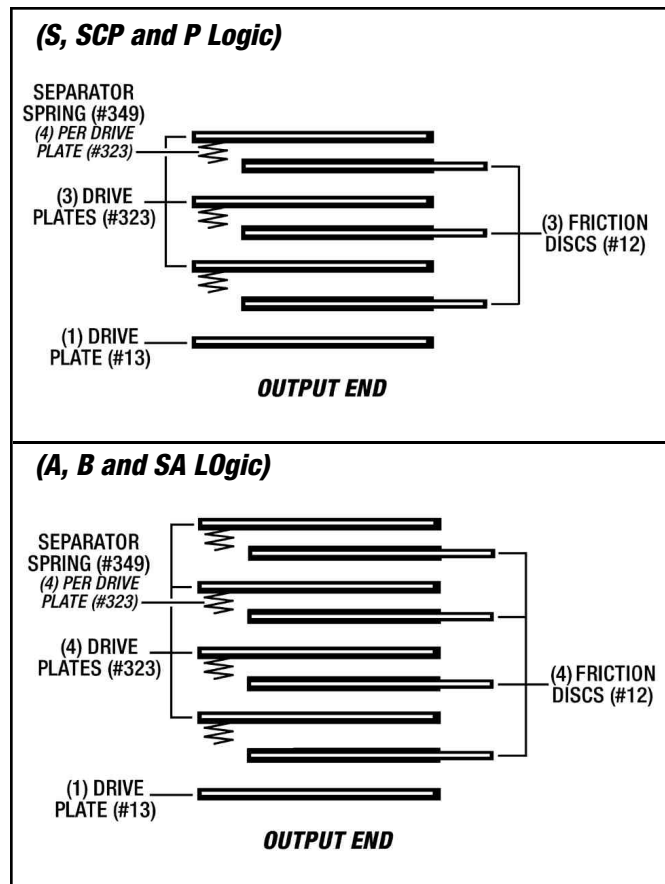


Figure 9.6 - Brake Stack (Vertical Installation)

## 9-6 REASSEMBLY OF PISTON SUB-ASSEMBLY

(See Figure 10.1)

1. Apply Sealant (**Loctite #620**) to the I.D. of Bearing (#27) and press it onto the Thrust Plate (#5). Make sure that the Bearing is firmly seated on the Thrust Plate shoulder.
2. Apply Sealant (**Loctite #620**) to the O.D. of Bearing (#27). Press the Bearing and Thrust Plate into the Piston (#3). Again, make sure the bearing is firmly seated in the Piston.
3. Lubricate the (2) O-Rings (#40) and install them on the Piston (#3).
4. Heat the Teflon Liner (#43) to 200° F. max. and install it on the Piston (#3). Also lubricate this Liner before installing it.

### CAUTION

Use suitable work gloves when handling heated parts.

## 9-7 INSTALLING PISTON SUB-ASSEMBLY AND PISTON RETAINER (See Figures 9.7 and 10.1)

1. Lubricate the O-Ring (#39) and the Teflon Liner (#42) and install them into the Output Housing (#9).
2. **This step only applies to SCP Logic.** Place the (5) Springs (#36) back into the appropriate spring pockets in the Output Housing (#9).

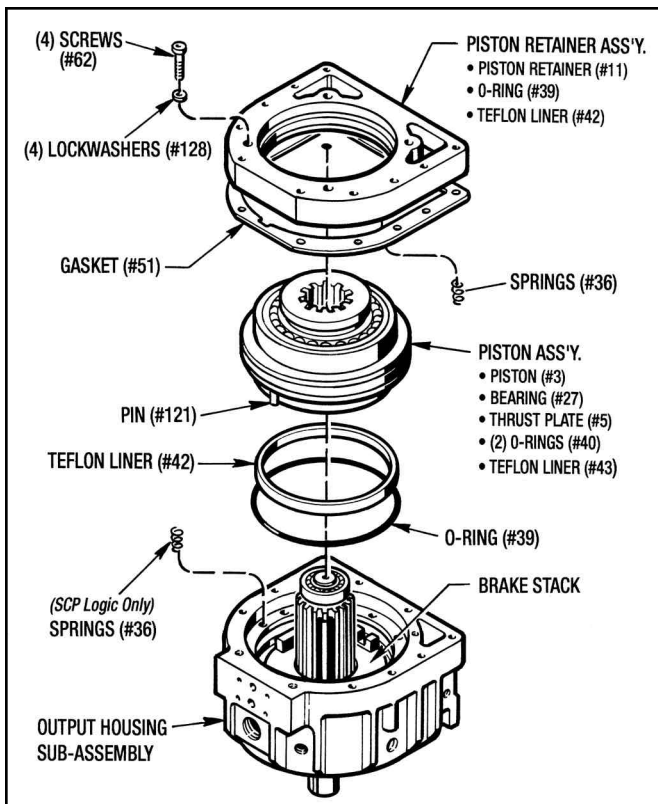


Figure 9.7 - Installing Piston and Piston Retainer

3. Insert the Piston Sub-Assembly down over the Output Shaft Spline and into the Output Housing. Align the (2) Pins (#121) in the Piston with the (2) slots in the Brake Pressure Plate (#97). **Be careful not to damage the installed Teflon Liners (#42) and (#43).**
4. Lubricate the O-Ring (#39) and the Teflon Liner (#42). Install them into the Piston Retainer (#11).
5. Place the Gasket (#51) onto the Output Housing (#9), using the Dowel Pin (#68) to assure proper alignment. **Use Gasket Sealant (Permatex #3D). Wipe off any excess.**
6. Place the Springs (#36) back into the appropriate holes in the Piston Retainer (#11). White Grease may be used to hold the Springs in place.
7. Push the Piston Retainer (#11) down and over the Piston (#3) and onto the Output Housing. **Be careful not to damage the Teflon Liner (#42) in the Piston Retainer.**
8. Attach with (4) Screws (#62) and (4) Lockwashers (#128).

#### IMPORTANT

Compress these (4) Screws in an even manner to compress the Springs (#36) correctly. Torque to 14 Ft. Lbs.

### 9-8 INSTALLING CLUTCH STACK

(See Figure 10.1)

See Section 9-18 for Measuring and Controlling Stack Height Dimensions.

1. Install the Clutch Stack onto the Output shaft spline, starting with a Friction Disc (#12), then a Drive Plate (#13) end-

ing with a Drive Plate (#13). There are (4) Friction Discs and (4) Drive Plates.

Align the notches in the Drive Plates with each other and align the internal teeth in the Friction Discs with the spline in the Output Shaft.

### 9-9 INSTALLING INPUT HOUSING SUB-ASSEMBLY

(See Figure 10.1)

1. Place the Gasket (#53) on the Piston Retainer (#11), using the (2) Pins (#68) for alignment. Use **(Permatex #3D)** Gasket Sealant. Wipe off any excess.
2. Lower the Input Housing Sub-Assembly down onto the Piston Retainer, aligning the lugs on the Input Shaft (#2) with the notches in the Drive Plates (#13). Press the Input Housing down until the (2) Dowel Pins (#68) engage the Input Housing. Make sure that Gasket (#53) stays in position.

#### CAUTION

**Do not force the Input Shaft Lugs into the Clutch Stack. This could damage the Drive Plates. Lower the Input Housing slowly and, if necessary, manually adjust the Drive Plates.**

3. With the (10) Screws (#69) and (10) Lockwashers (#127) bolt the Housings together. Use (Loctite #271) Thread-Locker on the threads. Torque to 14 Ft. Lbs.
4. If your Drive Unit has a Male Input Shaft, but does not have Fan Cooling, install Key (#180) into the Input Shaft (#2).

Before proceeding any further an **Operational Check of the Piston Movement should be made.** Apply 60 to 80 PSI as indicated in **Section 5 - Operational Checks.** Observe the piston movement through the inspection ports.

### 9-10 INSTALLING MANIFOLD MOUNTED CONTROL VALVE

(See Figure 10.5)

1. Put the Gasket (#807) on the Output Housing (#9). Use **(Permatex #3D)** Gasket Sealant. **Make sure that no sealant gets into the pressure ports.**
2. Attach Manifold (#701) with (4) Screws (#730) and (4) Lockwashers (#740).
3. Attach the Control Valve (#700) to the Manifold (#701) with (2) Screws (#725). Align the pressure port in the control valve with the Locating Tube (#810) sticking up out of the Manifold (#701). **Also make sure that the (2) Seal Rings (#808) are in place under the Control Valve.**

### 9-11 INSTALLING QUADRATURE ENCODER ASS'Y.

(See Figures 9.9 and 10.4)

1. Replace Key (#234) into the Posidyne output shaft if it was removed.
2. Attach the Housing (#17) to the Posidyne Output Housing with (2) Screws (#76) and (2) Washers (#257).
3. Slide the Pulse Gear (#186) onto the output shaft and align as shown in View B-B in Figure 9.9. Tighten Set Screw (#154)

Jump ahead to Section 9-12 and install the Quadrature Encoder (#355) and the Magnetic Pick-Up (#22).

4. Attach the Top Cover (#372) with (4) Screws (#225) and the Front Cover (#253) with (4) Screws (#268).

## 9-12 INSTALLING QUADRATURE ENCODER (#355) AND MAGNETIC PICK-UP (#22)

(See Figure 10.4)

Before installing the Quadrature Encoder and Magnetic Pick-Up a Special .015" Shim must be made to set the Gap between them and the Pulse Gear. (See Figure 9.8)

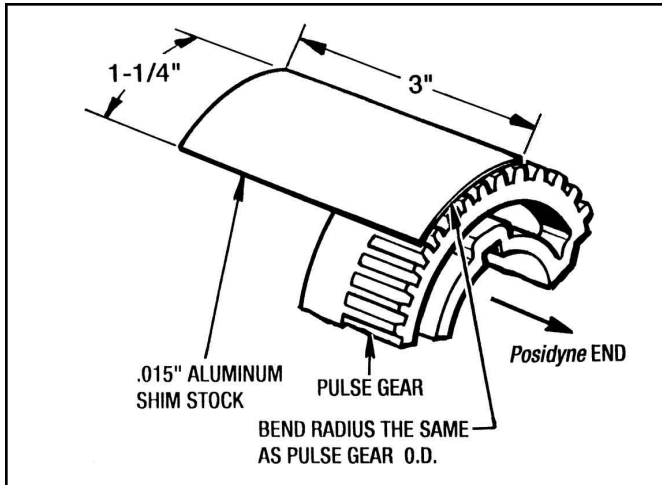


Figure 9.8 - Sensor Gap Shim

### A. QUADRATURE ENCODER (See Figure 9.9)

1. Looking through the hole where the Encoder is to be placed, check to see that the Pulse Gear (#186) is in position so the teeth will be aligned with the Encoder.
2. Position the Encoder so the (2) mounting holes are lined up with the holes in the housing. Insert the Sensor into the slot and attach with (2) Screws (#226).

#### NOTES:

1. The holes are offset to one side so the Encoder can only be installed one way.
2. Do not install any Shims (#900 to 903) at this time.  
**The Gap must be checked first.**
3. Check the Gap between the Pulse Gear and the Encoder with the Special .015" Shim that you made. If necessary, remove the Encoder and place Shims (#900 to #903) under the Encoder. (Usually .015" is sufficient.) Re-attach the Encoder and re-check the Gap. (See Figure 9.9)
4. Connect the sensor wires to the Brad Harrison Connector.

### B. MAGNETIC PICK-UP SENSOR (See Figure 9.9)

1. Visually check through the hole to see if the single tooth in the Pulse Gear (#186) is aligned with the Sensor and that the teeth for the Quadrature Encoder will not be visible to the Magnetic Pick-Up Sensor.

The Magnetic Pick-Up Sensor has a **Scribed Line** down one side of it. To facilitate installation, highlight this **Scribed Line** with a felt tip pen.

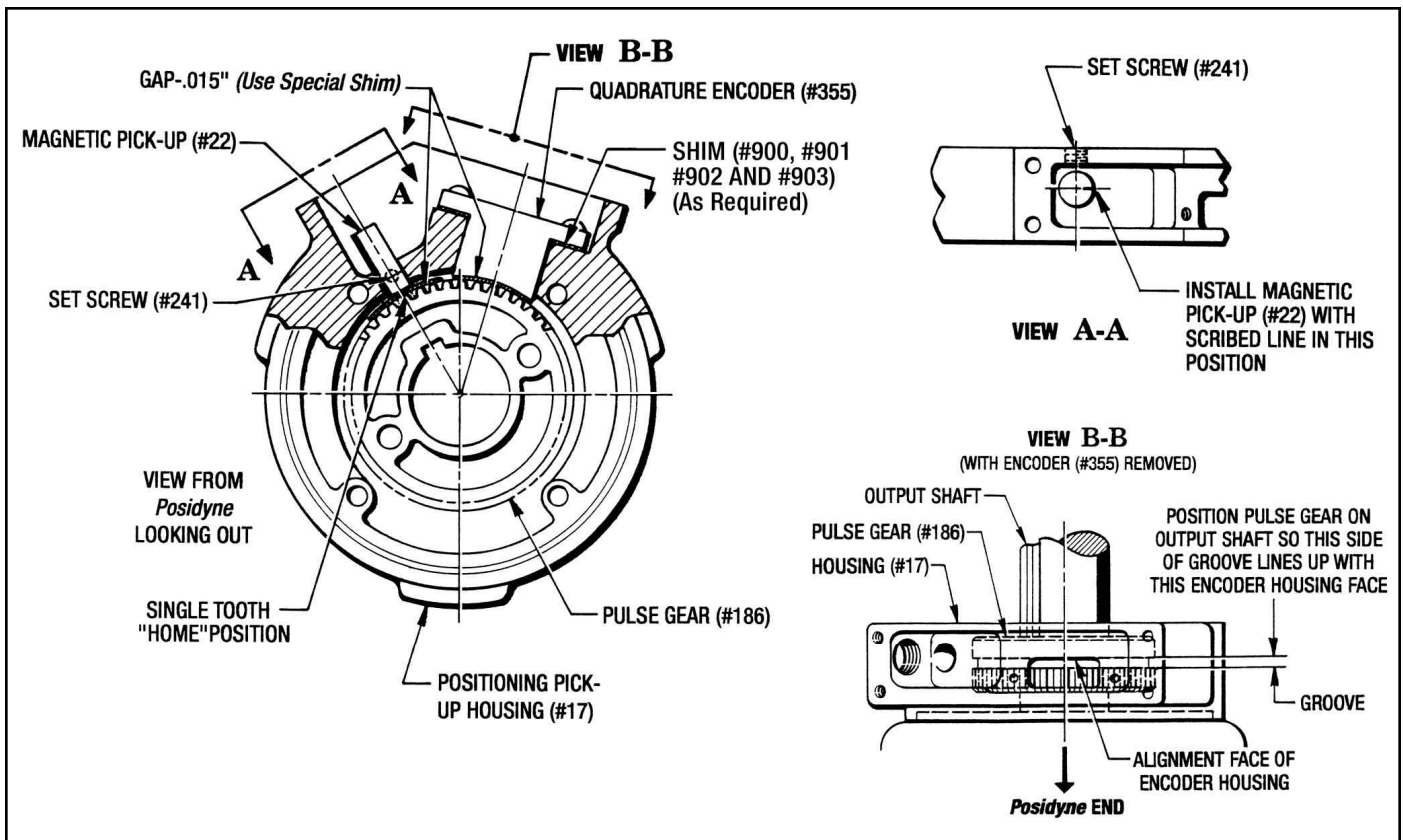


Figure 9.9 - Installation of Position Sensors

2. Insert the Magnetic Pick-Up Sensor (#22) into the hole with the **Scribed Line** in position as shown in *Figure 9.9, View A-A*
3. Insert the Special .015" Shim in between the Pulse Gear and the Sensor. Tighten the Set Screw (#241).
4. Connect the sensor wires to the Brad Harrison Connector.

### 9-13 REASSEMBLY and INSTALLATION of DIFFERENTIAL LINE DRIVER ENCODER (Optical Encoder)

(See Figure 10.4)

1. First slide the Spacer (#270) onto the output shaft as far as it will go. Install Key (#234), then slide the Optical Disc Assembly onto the output shaft, butting it up against the Spacer. (See Figure 9.10)

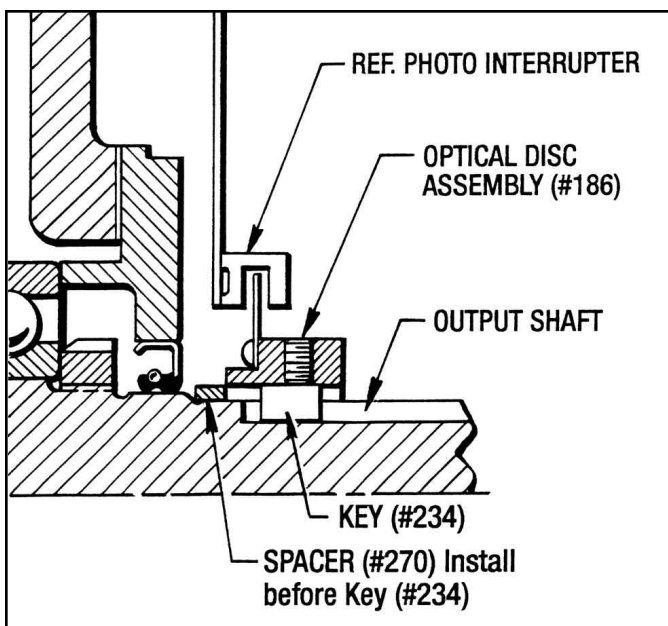


Figure 9.10 - Optical Disc and Hub Positioning

2. Tighten Set Screw (#154) and recheck the Hub position on the output shaft.
3. Apply a light coat of grease to the area on the Hub where the Dirt Seal (#269) rides.
4. If the Dirt Seal (#269) was removed then install it onto the Disc Housing (#17).
5. Attach the Disc Housing (#17) to the output end of the Posidyne with the (4) Screws (#76).
6. Place the Gasket (#19) on top of the Disc Housing.
7. Carefully insert the Circuit Board (#355) into the top of the Disc Housing making sure the (3) Photo Interrupters straddle the Optical Disc. (See Figures 9.10 and 9.11)
8. While holding the Circuit Board upright slide the Upper Enclosure (#18) down over the Circuit Board onto the Disc Housing. Make sure the edges of the Circuit Board are in the (2) side retaining slots located in the Upper Enclosure. (See Figure 9.11)
9. Check the Gasket (#19) to see if it is still in place. Insert the (2) Screws (#77) and tighten down.

10. Slide the Insulator (#373) down and into the Upper Enclosure (#18) behind the Circuit Board (#355) placing the upper tabs into the circuit board slots. (See Figure 9.11)

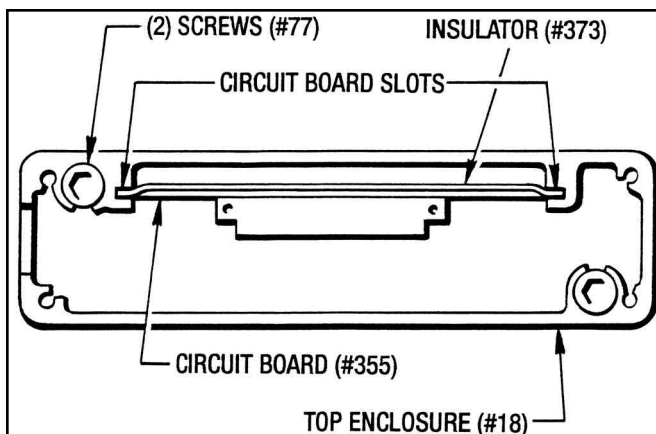


Figure 9.11 - Circuit Board Slots

11. Place the Cable Grommet (#260) and Cable (#259) into the upper slot and plug in the Cable Connector (#368) to the Circuit Board Connector and tighten the (2) Captive Screws in the Cable Connector. (See Figure 9.12)
12. Place the top Gasket (#19) on the Upper Enclosure and attach the Top Cover (#372) with (4) Screws (#225).

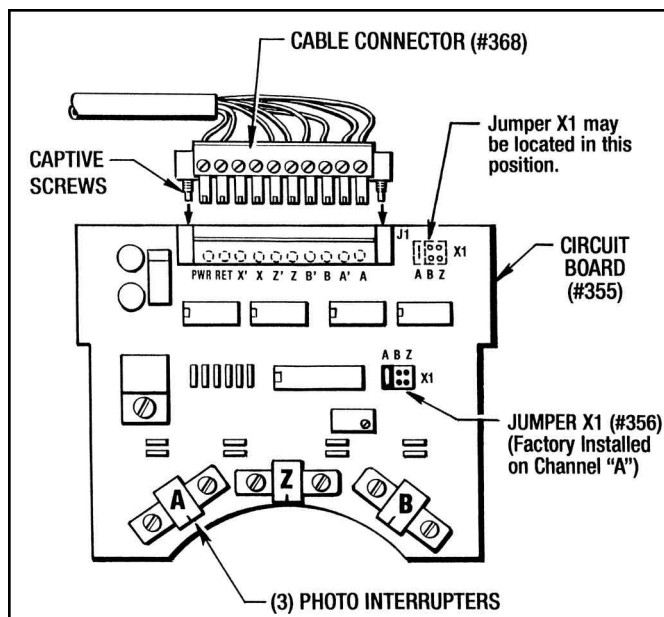


Figure 9.12 - Circuit Board Connector

### 9-14 INSTALLING FAN AND FAN SHROUD

(See Figure 10.6)

1. Install Key (#37) into the Input Shaft.
2. Place Fan (#25) on the Input Shaft until it butts up against the shoulder on the input shaft. Tighten the (2) Set Screws (#70).
3. Place the Fan Shroud (#24) into position and attach with (2) Screws (#66).
4. Install Key (#180) into the Input Shaft.

## 9-15 ATTACHING C-FACE ADAPTERS

### A. Output C-Face Adapter

(See Figure 10.2)

1. Attach the C-Face Adapter (#203) with (8) Screws (#204) and (8) Lockwashers (#205). **Torque to 25 Ft. Lbs.**

### B. Input C-Face Adapters (With Quill Input Shaft Only)

(See Figure 10.3)

1. Attach C-Face Adapter (#200) with (6) Screws (#201) and (6) Lockwashers (#202). **Torque to 25 Ft. Lbs.**

## 9-16 INSTALLING PIGGYBACK DRIVE MOTOR, BELT GUARD and MOUNTING BRACKETS

(See Figure 10.7)

1. Attach Input Motor Mounting Bracket (#148) with (4) Screws (#255).
2. If you do not have Fan Cooling, then attach the (2) Mounting Brackets (#165) with (2) Screws (#150) and (2) Lockwashers (#265).
3. Attach the Output Motor Mounting Bracket (#149) with (4) Screws (#76).
4. Attach the (2) Motor Adapter Plates (#153) with the (4) Studs (#254), (8) Jam Nuts (#152) and (4) Lockwashers (#257) as shown in Figure 10.7.

**NOTE** - These Studs (#254) and Jam Nuts (#152) are used to raise and lower the drive motor for installing the Drive Belt and Belt Tensioning procedure.

5. Reinstall the lower back plate of Belt Guard (#124) with (2) Screws (#305) and (4) Screws (#268).

**NOTE** - If you do not have Fan Cooling, the (2) Spacers (#288) will go behind the (2) Screws (#305).

6. Lower the Drive Motor into place and attach with (4) motor mounting bolts.
7. Install Drive Pulleys and Drive Belt as per Manufacturer's Specifications. (See Figure 9.13 for Drive Pulley Installation)

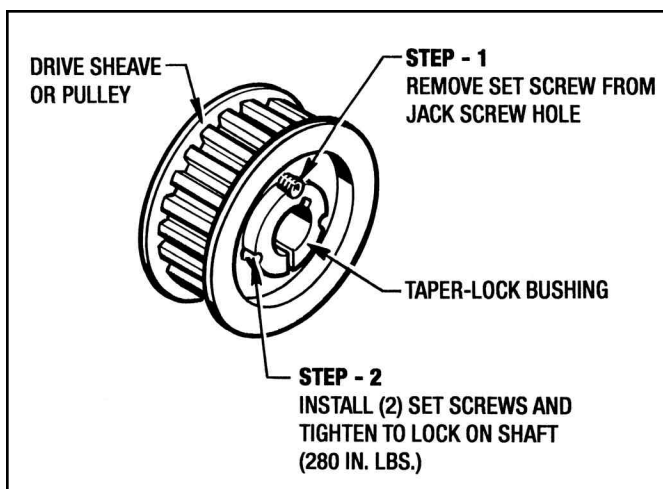


Figure 9.13 - Installation of Drive Pulley

## 9-17 FINAL REASSEMBLY

1. Replace all Pipe Plugs and Fittings removed for Inspection or Disassembly.
2. Fill the Drive Unit with Mobil Automatic Transmission Fluid type ATF-210 type "F" or Mobil Multi-purpose Automatic Transmission Fluid, as indicated in **Section 4 LUBRICATION**.

**NOTE** - Other fluids may be specified for special drives. Check the Name Tag.

3. Replace all external motor drive parts, safety guards, sheaves, pulleys, belts and couplings on belt drive units.
4. Before placing the Drive Unit back into service, completely check out the Operation as described in **Section 5 OPERATIONAL CHECKS**.

**REASSEMBLY IS NOW COMPLETE AND THE DRIVE UNIT IS READY FOR SERVICE.**

## 9-18 MEASURING AND CONTROLLING STACK HEIGHT DIMENSIONS

(See Figure 9.14)

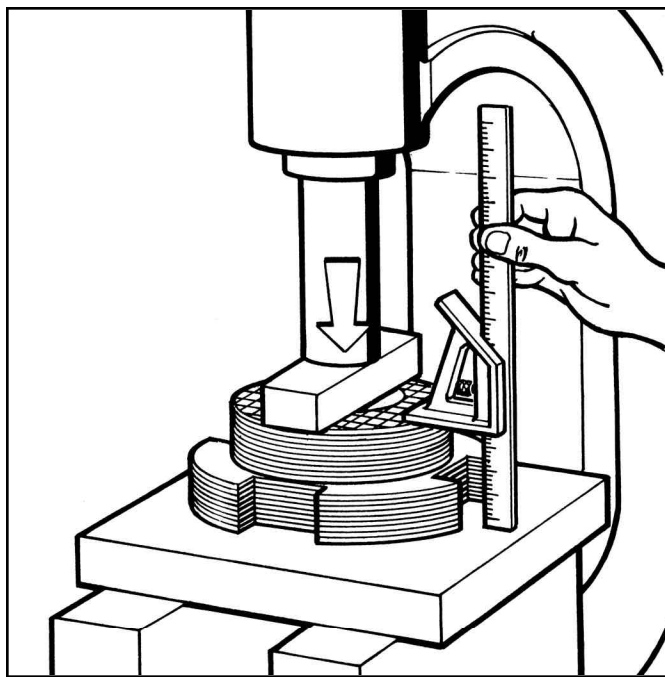


Figure 9.14 - Measuring Stack Height

To assure correct piston travel and stack engagement, the following steps must be taken when replacing the Clutch and Brake Stacks. **Worn Stack Condition** can also be determined with this procedure.

Measure the stacks as shown in Figure 9.14. **Always measure each stack separately.**

Place the correct number of Drive Plates (#13) and/or (#323) and Friction Discs (#12) in an arbor press as shown in Figure 9.14. (See page 24 for the correct quantity of Drive Plates and Friction Discs required for each logic.

Clamp firmly and measure the Stack Height. Compare the Measured Height with the tabulated value given in the Stack Height Table.

If the Measured Height exceeds the Min. or Max. contact Force Control Industries, Inc.

**NOTE** - The "Worn Stack Condition" given in the Stack Height Table can be used to determine whether or not your old stacks are worn enough to be replaced. Use this method if the drive unit is disassembled, otherwise if the drive unit is still assembled see Section 6-2 Checking the Clutch and Brake Stacks for Wear.

**STACK HEIGHT TABLE (Inches)**

| STACK  | LOGIC     | NEW STACK HEIGHT |                  |         |                  | WORN STACK CONDITION |                  |
|--------|-----------|------------------|------------------|---------|------------------|----------------------|------------------|
|        |           | MINIMUM          |                  | MAXIMUM |                  | DECIMAL              | NEAREST FRACTION |
|        |           | DECIMAL          | NEAREST FRACTION | DECIMAL | NEAREST FRACTION |                      |                  |
| CLUTCH | S, SA & A | .640             | 41/64            | .684    | 11/16            | .531                 | 17/32            |
|        | B, P & C  |                  |                  |         |                  |                      |                  |
| BRAKE  | SA, A & B | .700             | 45/64            | .749    | 3/4              | .574                 | 37/64            |
|        | S & P     | .539             | 35/64            | .579    | 37/64            | .439                 | 7/16             |

## Section 10 ILLUSTRATED REPAIR PARTS

### 10-1 GENERAL INFORMATION

This section illustrates, lists and describes all available repair parts for the Force Control *Posidyne* Clutch/Brake Drives. Parts are identified on the exploded views with Part Reference Numbers. These Numbers correspond to the Part Reference Number given in the Parts List. The Part Name and Quantity Used is also given in the Parts List. This Part Reference Number, Part Name and Quantity should be used when ordering parts.

### 10-2 DRIVE MOTORS

The motors used with these Drive Units are standard and may be repaired or replaced by any qualified motor rebuild facility or supplier.

### 10-3 FACTORY REBUILD SERVICE

Reconditioning service is offered by Force Control Industries at the factory. The cost of a complete factory rebuild will be 50% the cost of a new unit if the housings are reusable. If the housings need to be replaced there will be an additional cost. Before returning a unit for this service, however, be sure to first contact the Force Control Industries Service Sales Department for authorization and shipping instructions. Force Control Industries cannot be responsible for units returned to the factory without prior notice and authorization.

Care must be given to the packing of return drives. Always protect mounting feet by attaching to a skid. Shipment-damaged drives always delay repairs. It is usually impossible to recover damage costs from the carrier. When possible describe the problem experienced on your shipping papers.

Return to: **Force Control Industries, Inc.**  
**3660 Dixie Highway**  
**Fairfield, Ohio 45014**  
**Phone: (513) 868-0900**  
**Fax: (513) 868-2105**  
**E-Mail: info@forcecontrol.com**

### 10-4 ORDERING REPLACEMENT PARTS

When ordering replacement parts, please specify all of the following information:

1. **Drive Model Number** (on the nameplate)
2. **Drive Serial Number** (on the nameplate)
3. **Part Reference Number** (from the parts list or exploded view drawing.)
4. **Part Name** (from the parts list)
5. **Quantity** (from the parts list)
6. **Complete Shipping Information**

Failure to include information for items 1 thru 6 will only delay your parts order. Unless another method is specified for item 6, parts less than 150 pounds will be shipped United Parcel Service, parts over 150 pounds will be shipped Motor Freight. Air freight and other transportation services are available but only if specified on your order.

### 10-5 NAME PLATE AND MODEL NUMBER

The Name Plate shown is located on the housing.

**Force Control Industries, Inc.**  
Fairfield, Ohio

**For Service/Parts Call**  
**513-868-0900**

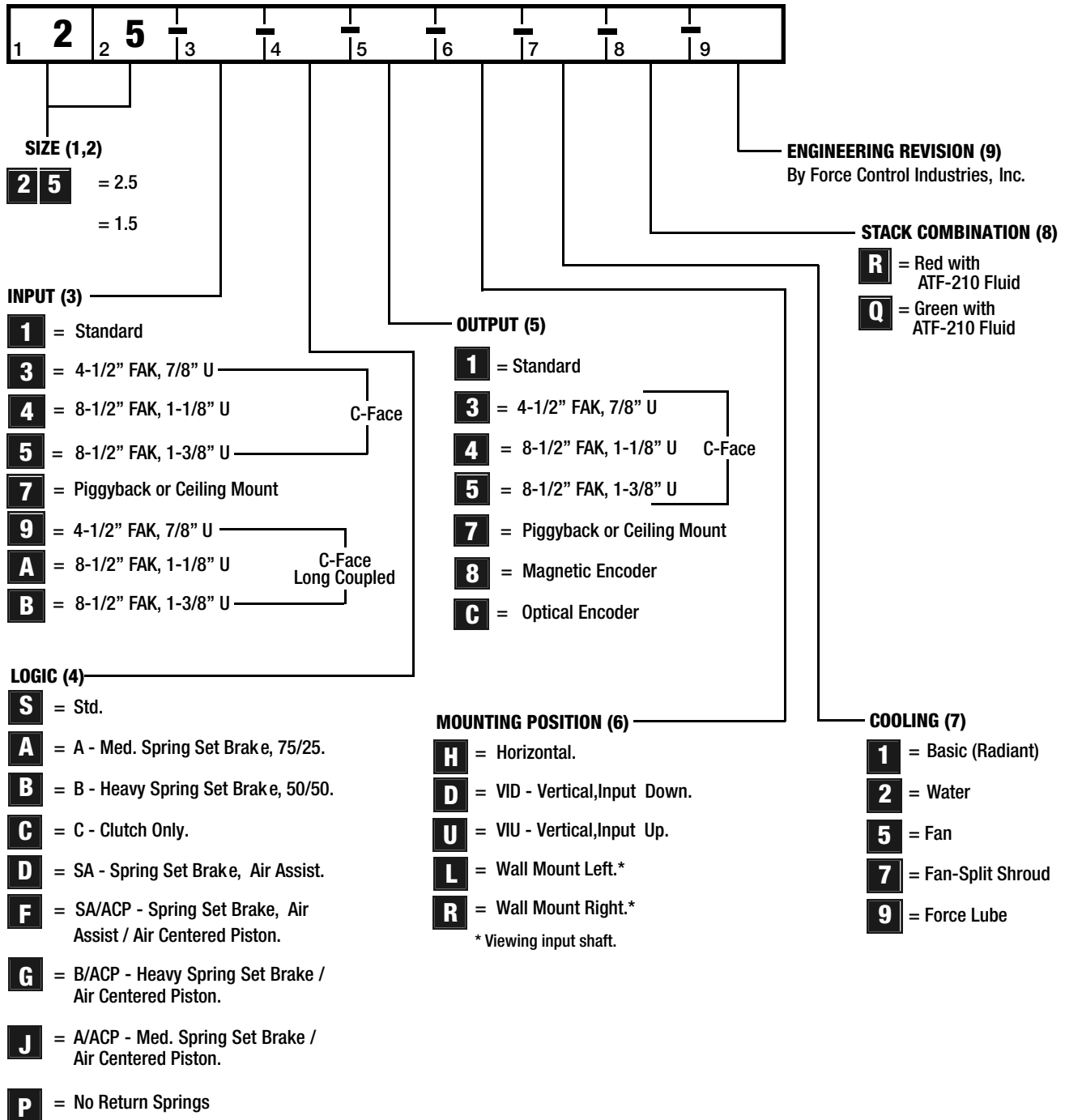
**Posidyne®** Clutch/Brake

Model No.

Serial No.

Use Mobil® ATF 210

## Posidyne Model Numbers



*(Repair Parts List for Figure 10.1)*  
**2.5 Posidyne CLUTCH/BRAKE ASSEMBLY**

| REF No. | PART NAME                       | QTY. | REF No. | PART NAME                                       | QTY. |
|---------|---------------------------------|------|---------|-------------------------------------------------|------|
| 1       | Output Shaft .....              | 1    | **46    | Sight Gauge .....                               | 1    |
| 3       | Piston .....                    | 1    | *51     | Gasket, Output Housing .....                    | 1    |
| **5     | Thrust Plate, Clutch .....      | 1    | *53     | Gasket, Input Housing .....                     | 1    |
| 7       | Bearing Retainer .....          | 1    | *55     | Gasket, Bearing Retainer .....                  | 1    |
| 9       | Output Housing .....            | 1    | 62      | Soc. Hd. Cap Screw .....                        | 4    |
| 11      | Piston Retainer .....           | 1    | 63      | Soc. Hd. Cap Screw .....                        | 6    |
| *12     | Friction Disc (See Below) ..... | AR   | 64      | Soc. Hd. Cap Screw .....                        | 4    |
| *13     | Drive Plate (See Below) .....   | AR   | 68      | Dowel Pin .....                                 | 2    |
| 14      | Pipe Plug, 1" NPT .....         | 1    | 69      | Soc. Hd. Cap Screw .....                        | 10   |
| *27     | Bearing .....                   | 1    | 72      | Pipe Plug, 1" NPT .....                         | 1    |
| *28     | Bearing .....                   | 1    | 73      | Pipe Plug, 1/4" NPT Mag. ....                   | 2    |
| *31     | Oil Seal .....                  | 1    | 90      | Reducer Bushing, 3/8" x 1/4" .....              | 1    |
| **34    | Locknut .....                   | 1    | 97      | Brake Pressure Plate .....                      | 1    |
| *35     | Bearing .....                   | 1    | 121     | Dowel Pin .....                                 | 2    |
| *36     | Spring                          |      | 122     | Dowel Pin .....                                 | 2    |
|         | S Logic .....                   | 5    | 126     | Street Elbow (As Required) .....                | 1    |
|         | SA Logic .....                  | 16   | 127     | Lockwasher .....                                | 10   |
|         | A Logic .....                   | 9    | 128     | Lockwasher .....                                | 4    |
|         | B Logic .....                   | 18   | 181     | Key, Output Shaft .....                         | 1    |
|         | SCP Logic .....                 | 10   | *323    | Drive Plate w/ Rivets (Vert.) (See Below) ..... | AR   |
| *39     | O-Ring .....                    | 2    | 343     | Pipe Plug .....                                 | 2    |
| *40     | O-Ring .....                    | 2    | *349    | Spring, Separator (Vertical Installation)       |      |
| *42     | Liner, I.D. Sealing .....       | 2    |         | A, B and SA Logic .....                         | 16   |
| *43     | Liner, O.D. Sealing .....       | 1    |         | S, SCP and P Logic .....                        | 12   |
| **45    | Breather .....                  | 1    |         |                                                 |      |

\* - Indicates parts in Minor Overhaul Kit.

\*\* - Indicates parts in Major Overhaul Kit. (Plus all parts in Minor Overhaul Kit.)

AR - As Required.

**DRIVE PLATE & FRICTION DISCS QUANTITIES**

| BRAKE STACK                    | LOGIC |   |    |   |     |   |      |
|--------------------------------|-------|---|----|---|-----|---|------|
|                                | A     | B | SA | S | SCP | P | C    |
| HORIZONTAL UNIT                |       |   |    |   |     |   |      |
| Drive Plate (#13)              | 5     |   |    | 4 |     |   | ---- |
| Friction Disc (#12)            | 4     |   |    | 3 |     |   | ---- |
| VERTICAL UNIT                  |       |   |    |   |     |   |      |
| Drive Plate (#13)              | 1     |   |    | 1 |     |   | ---- |
| Drive Plate (#323) With Rivets | 4     |   |    | 3 |     |   | ---- |
| Friction Disc (#12)            | 4     |   |    | 3 |     |   | ---- |

The Clutch Stack has (4) Drive Plates (#13) and  
(4) Friction Discs (#12) for all Logics.

## 2.5 Posidyne CLUTCH/BRAKE ASSEMBLY

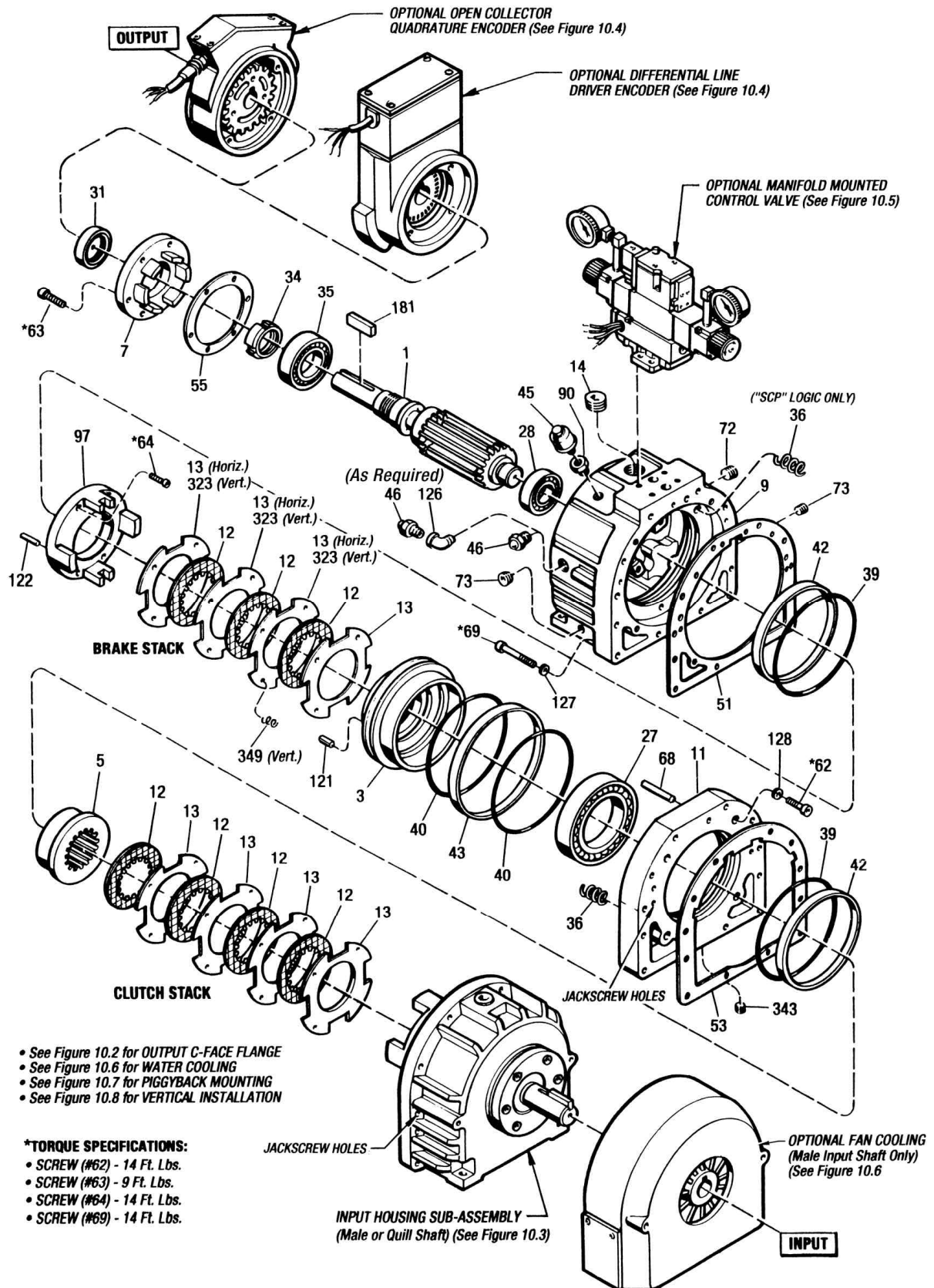


Figure 10.1 - 2.5 Posidyne Clutch/Brake Assembly

**FORCE CONTROL INDUSTRIES, INC.**



**INDUSTRIAL MAGZA®**  
DIST. AUTORIZADO

MEX (55) 53 63 23 31 MTY (81) 83 54 10 18  
QRO (442) 1 95 72 60 ventas@industrialmagza.com

*(Repair Parts List for Figures 10.2 & 10.3)*

**INPUT HOUSING SUB-ASSEMBLY**

**OUTPUT C-FACE ADAPTER**

| REF No. | PART NAME                | QTY. | REF No. | PART NAME                   | QTY. |
|---------|--------------------------|------|---------|-----------------------------|------|
| 2       | Input Shaft.....         | 1    | 200     | C-Face Flange, Input .....  | 1    |
| 7       | Bearing Retainer .....   | 1    | 201     | Soc. Hd. Cap Screw .....    | 6    |
| 8       | Input Housing.....       | 1    | 202     | Lockwasher .....            | 6    |
| 14      | Pipe Plug, 1" NPT .....  | 1    | 203     | C-Face Flange, Output ..... | 1    |
| *26     | Bearing.....             | 1    | 204     | Soc. Hd. Cap Screw .....    | 8    |
| *31     | Oil Seal .....           | 1    | 205     | Lockwasher .....            | 8    |
| **34    | Locknut .....            | 1    | *206    | Gasket.....                 | 1    |
| *38     | Bearing.....             | 1    | 207     | Bearing Retainer .....      | 1    |
| *55     | Gasket.....              | 1    | *208    | Oil Seal .....              | 1    |
| 63      | Soc. Hd. Cap Screw ..... | 6    | **209   | Locknut .....               | 1    |
| 99      | Freeze Plug.....         | 1    | 210     | Soc. Hd. Cap Screw .....    | 6    |
| 104     | O-Ring.....              | 1    | 415     | Hex Hd. Cap Screw .....     | 4    |
| 180     | Key, Input Shaft.....    | 1    | 416     | Lockwasher .....            | 4    |

\* - Indicates parts in Minor Overhaul Kit.

\*\* - Indicates parts in Major Overhaul Kit. (Plus all parts in Minor Overhaul Kit.)

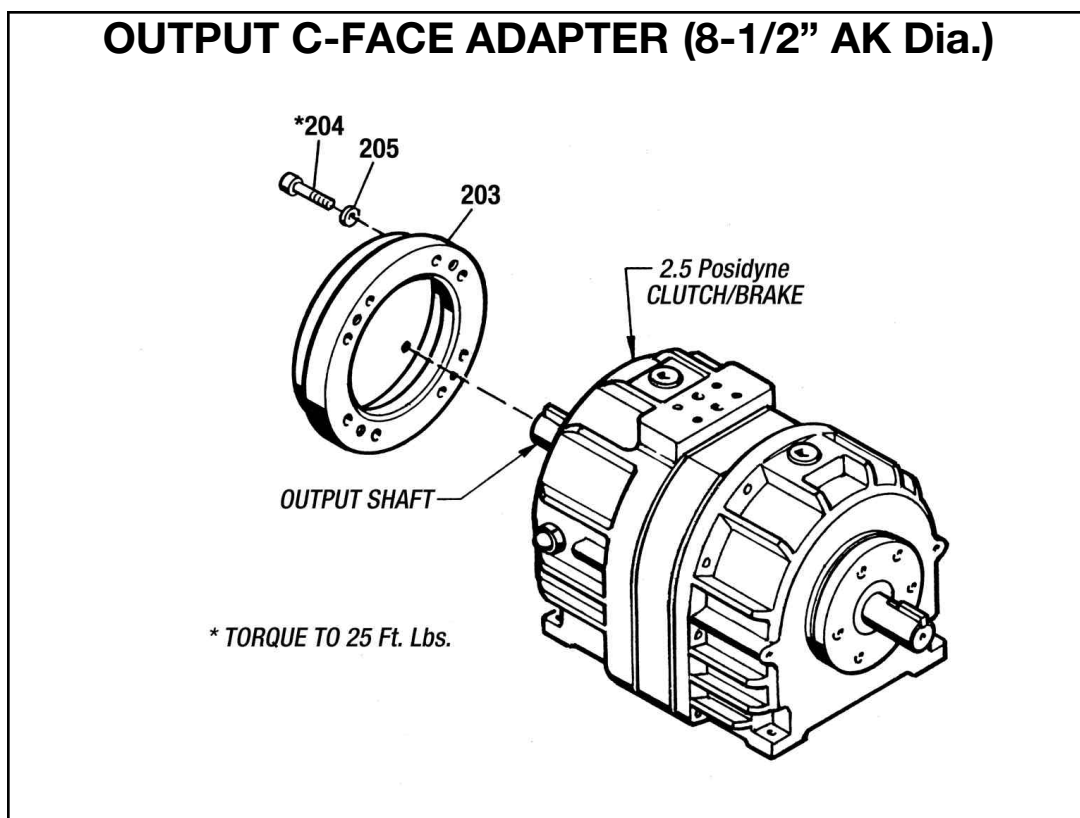
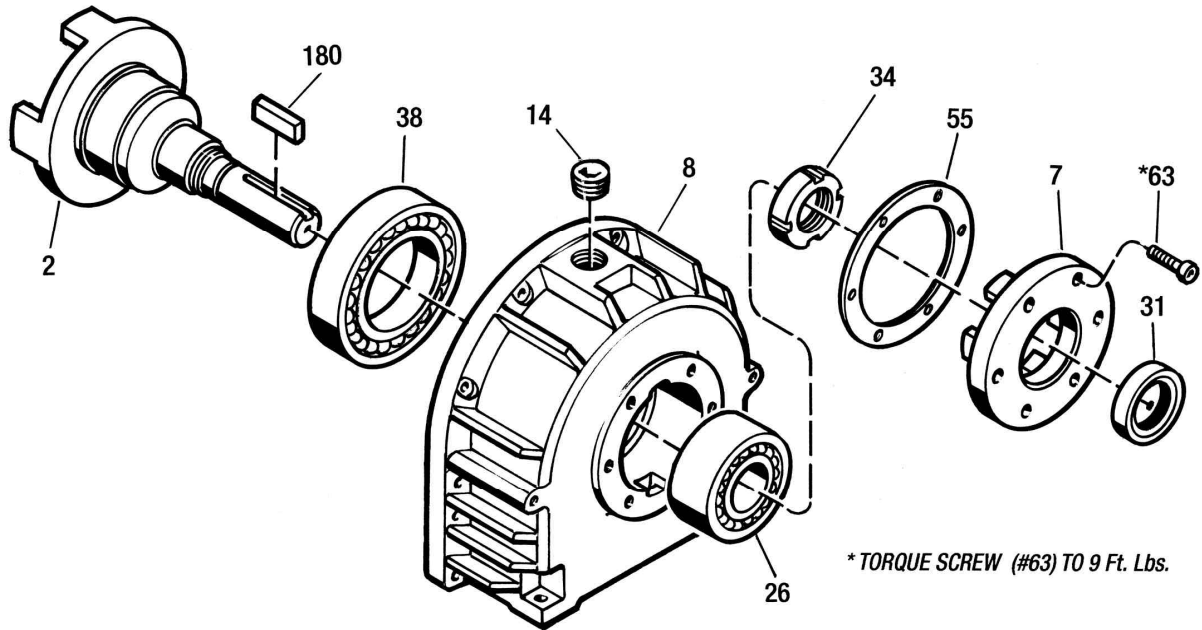


Figure 10.2 - Output C-Face Adapter (8-1/2" AK Dia.)

## INPUT HOUSING SUB-ASSEMBLY (With Male Input Shaft For Coupling or Belt Drive)



## (With Quill Input Shaft For C-Face Mounting)

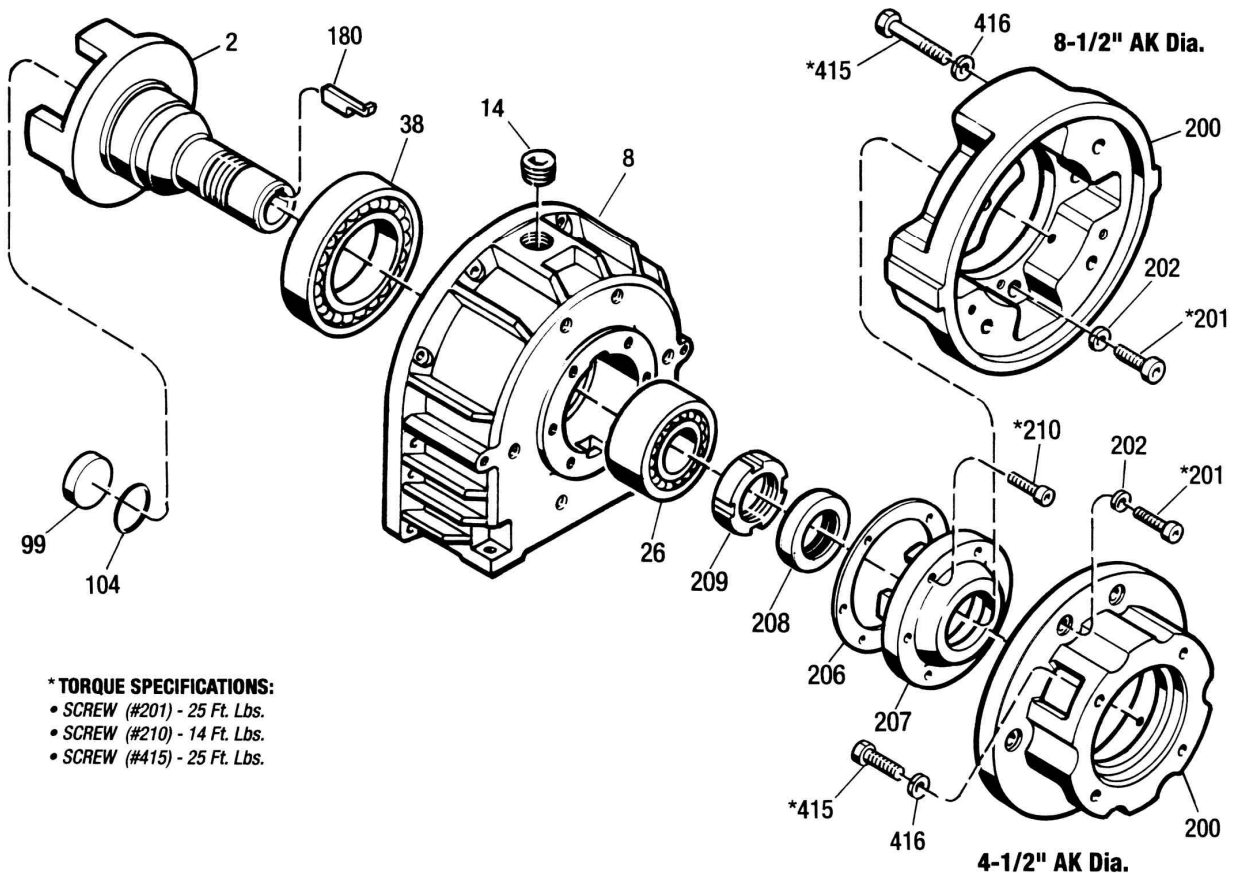


Figure 10.3 - Input Housing Sub-Assembly

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*(Repair Parts List for Figure 10.4)*  
**OPEN COLLECTOR QUADRATURE ENCODER**

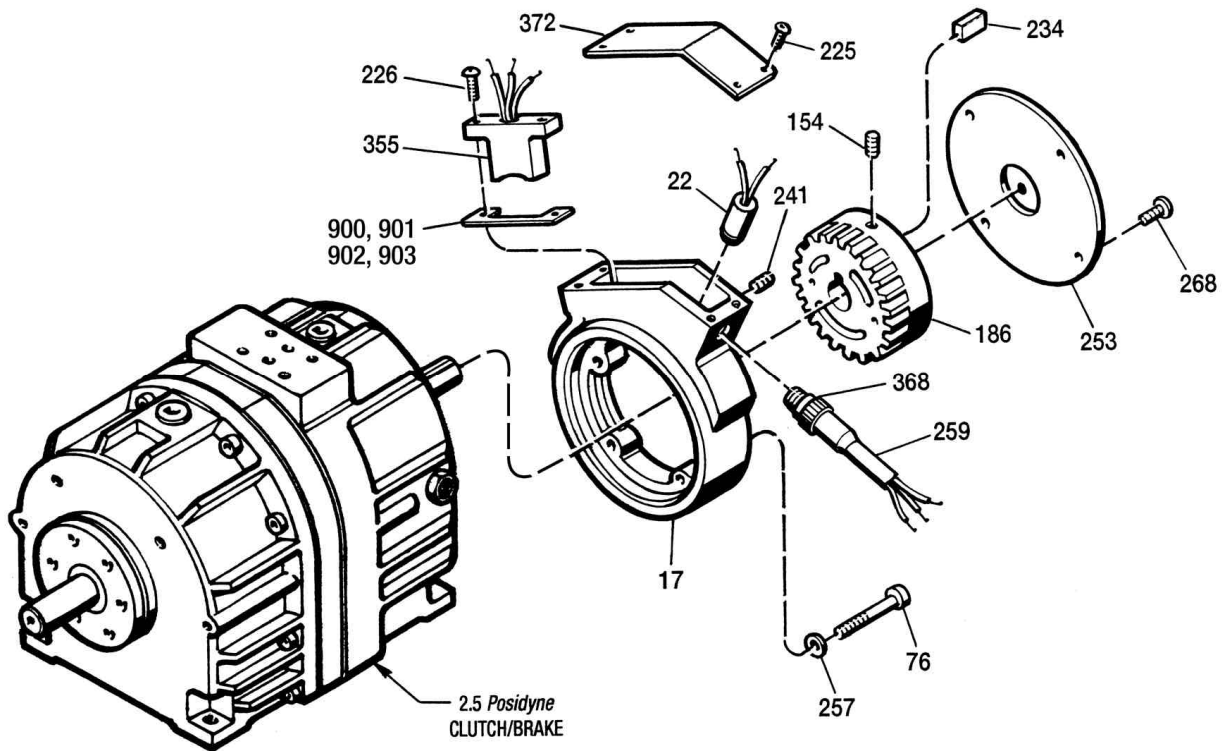
| REF No. | PART NAME                     | QTY. | REF. No. | PART NAME                   | QTY. |
|---------|-------------------------------|------|----------|-----------------------------|------|
| 17      | Magnetic Pickup Housing ..... | 1    | 257      | Lockwasher .....            | 4    |
| 22      | Magnetic Pickup .....         | 1    | 259      | Cable, 5 Pin Straight ..... | 1    |
| 76      | Soc. Hd. Cap Screw .....      | 4    | 268      | But. Hd. Cap Screw .....    | 4    |
| 154     | Set Screw .....               | 1    | 355      | Quadrature Pickup .....     | 1    |
| 186     | Pulse Gear .....              | 1    | 368      | Cable Receptacle .....      | 1    |
| 225     | But. Hd. Cap Screw .....      | 4    | 372      | Top Cover .....             | 1    |
| 226     | Rd. Hd. Cap Screw .....       | 2    | 900      | Shim, .005" Thick .....     | AR   |
| 234     | Key .....                     | 1    | 901      | Shim, .010" Thick .....     | AR   |
| 241     | Set Screw .....               | 1    | 902      | Shim, .020" Thick .....     | AR   |
| 253     | Housing Cover .....           | 1    | 903      | Shim, .0305" Thick .....    | AR   |

\* - Indicates parts in Minor Overhaul Kit.  
AR - As Required.

*(Repair Parts List for Figure 10.4)*  
**DIFFERENTIAL LINE DRIVER OPTICAL ENCODER**

| REF No. | PART NAME                   | QTY. | REF. No. | PART NAME             | QTY. |
|---------|-----------------------------|------|----------|-----------------------|------|
| 17      | Disc Housing .....          | 1    | 259      | Cable .....           | 1    |
| 18      | Upper Enclosure .....       | 1    | 260      | Cable Grommet .....   | 1    |
| 19      | Gasket .....                | 2    | 269      | Dirt Seal .....       | 1    |
| 76      | Soc. Hd. Cap Screw .....    | 4    | 270      | Spacer .....          | 1    |
| 77      | Soc. Hd. Cap Screw .....    | 2    | 355      | Circuit Board .....   | 1    |
| 154     | Set Screw .....             | 1    | 356      | Jumper .....          | 1    |
| 186     | Optical Disc Assembly ..... | 1    | 368      | Cable Connector ..... | 1    |
| 225     | Button Hd. Screw .....      | 4    | 372      | Top Cover .....       | 1    |
| 234     | Key .....                   | 1    | 373      | Insulator .....       | 1    |

## OPEN COLLECTOR QUADRATURE ENCODER



## DIFFERENTIAL LINE DRIVER OPTICAL ENCODER

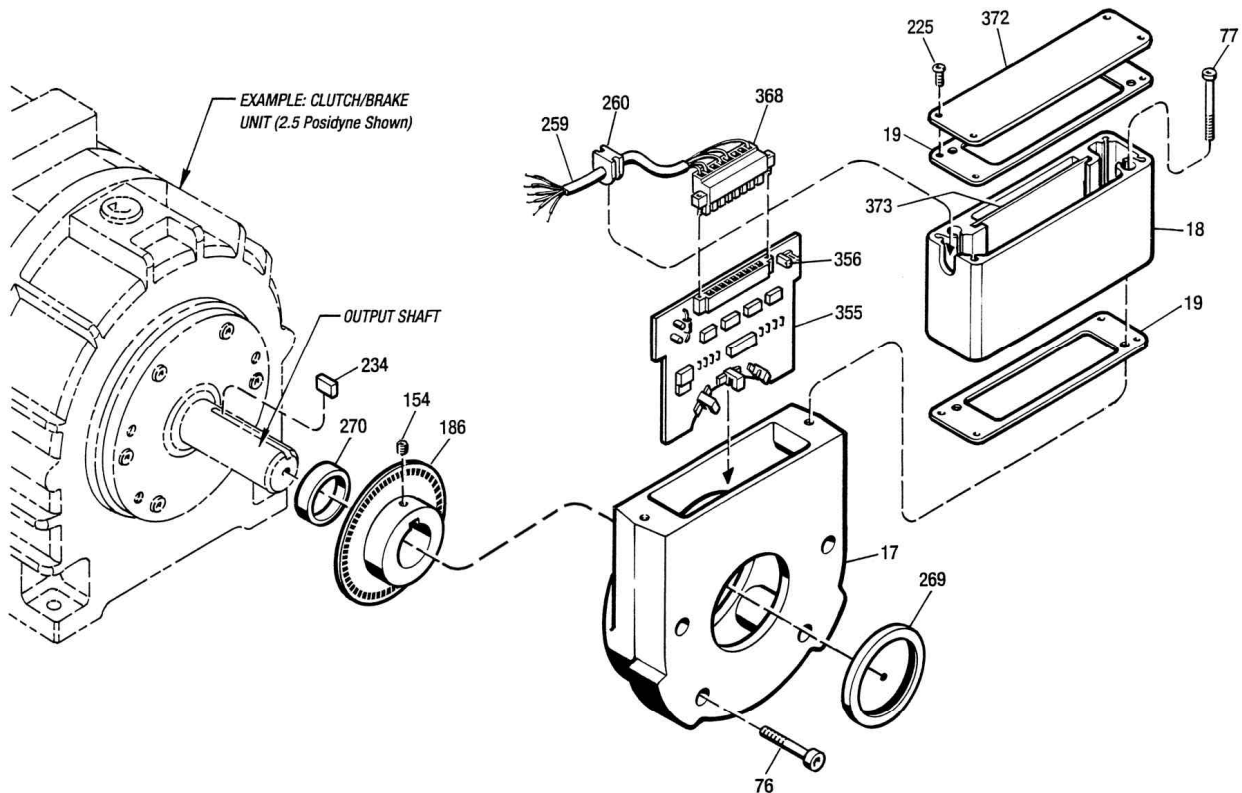


Figure 10.4 - Encoders

(Repair Parts List for Figure 10.5)  
**MANIFOLD MOUNTED CONTROL VALVE**

| REF No. | PART NAME                | QTY. | REF No. | PART NAME             | QTY. |
|---------|--------------------------|------|---------|-----------------------|------|
| 700     | Control Valve.....       | 1    | 779     | Muffler .....         | 1    |
| 701     | Manifold.....            | 1    | *807    | Gasket Manifold ..... | 1    |
| 725     | Soc. Hd. Cap Screw ..... | 2    | *808    | O-Ring .....          | 2    |
| 727     | Soc. Hd. Cap Screw ..... | 4    | 810     | Locating Tube.....    | 1    |
| 737     | Lockwasher .....         | 4    | 811     | Fastener .....        | 2    |
| 767     | Pressure Gauge           |      |         |                       |      |
|         | 1PC-3/8 Valve.....       | 1    |         |                       |      |
|         | 2PC-3/8 Valve.....       | 2    |         |                       |      |

\* - Indicates parts in Minor Overhaul Kit.

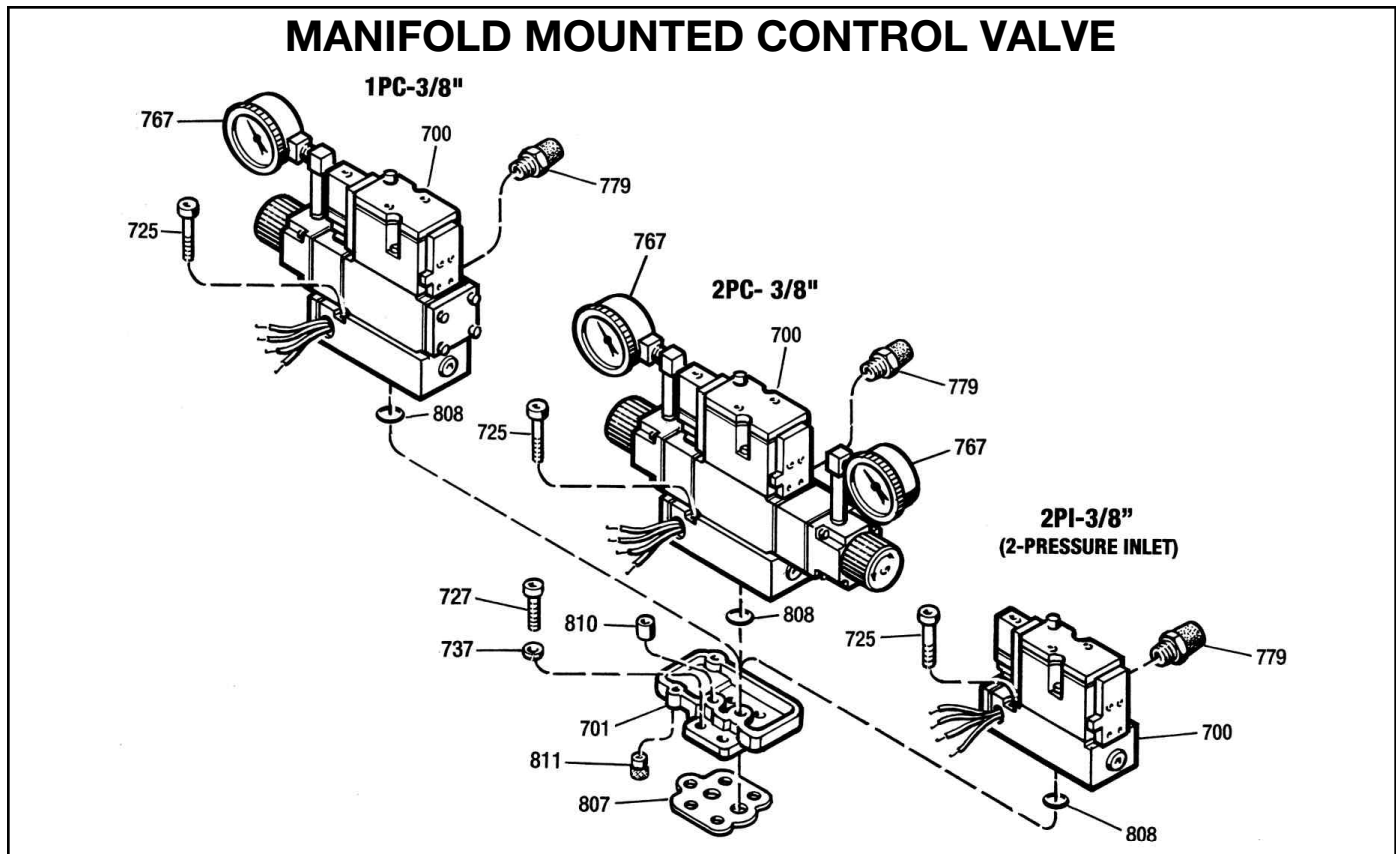
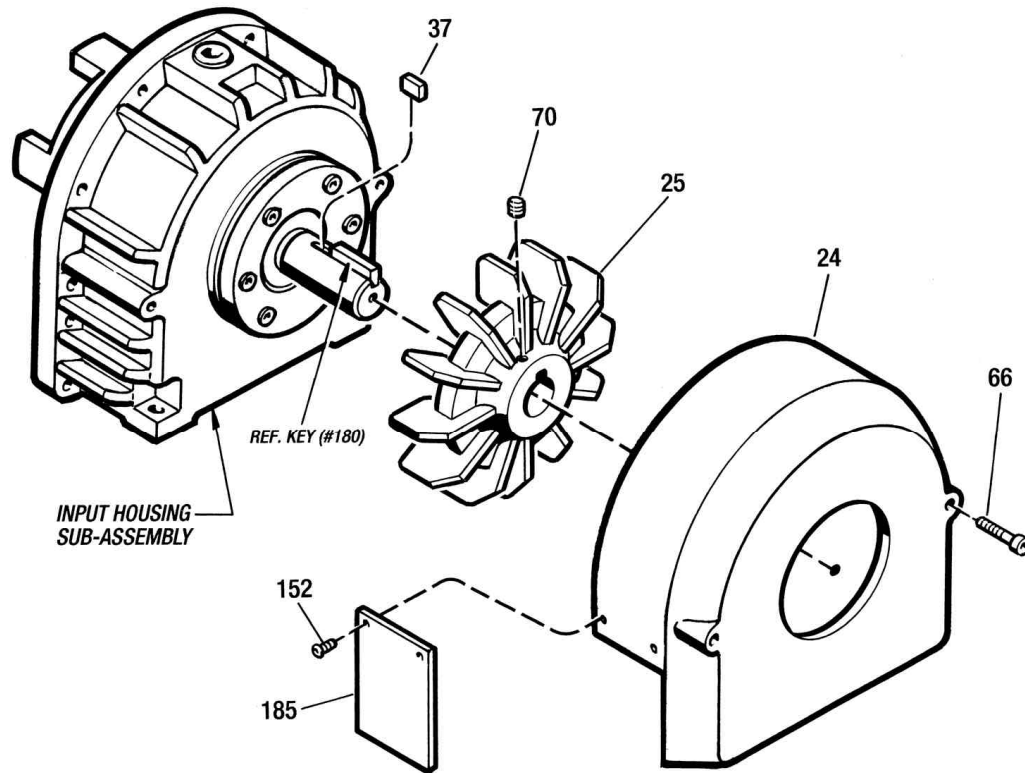


Figure 10.5 - Manifold Mounted Control Valve

(Repair Parts List for Figure 10.6)  
**FAN COOLING & WATER COOLING**

| REF No. | PART NAME                | QTY. | REF No. | PART NAME                | QTY. |
|---------|--------------------------|------|---------|--------------------------|------|
| 24      | Fan Shroud.....          | 1    | 152     | But. Hd. Cap Screw ..... | 4    |
| 25      | Fan .....                | 1    | 176     | Zinc Anode.....          | 1    |
| 37      | Key .....                | 1    | 177     | Pipe Coupling .....      | 1    |
| 48      | Heat Exchanger.....      | 1    | 178     | Pipe Nipple .....        | 1    |
| 56      | Soc. Hd. Cap Screw ..... | 2    | 185     | Access Cover .....       | 2    |
| 66      | Soc. Hd. Cap Screw ..... | 2    | 237     | Anti-Rotation Tag .....  | 2    |
| 70      | Set Screw .....          | 2    | 242     | Pipe Tee.....            | 1    |
| 71      | Compression Fitting..... | 2    |         |                          |      |

## FAN COOLING



## WATER COOLING

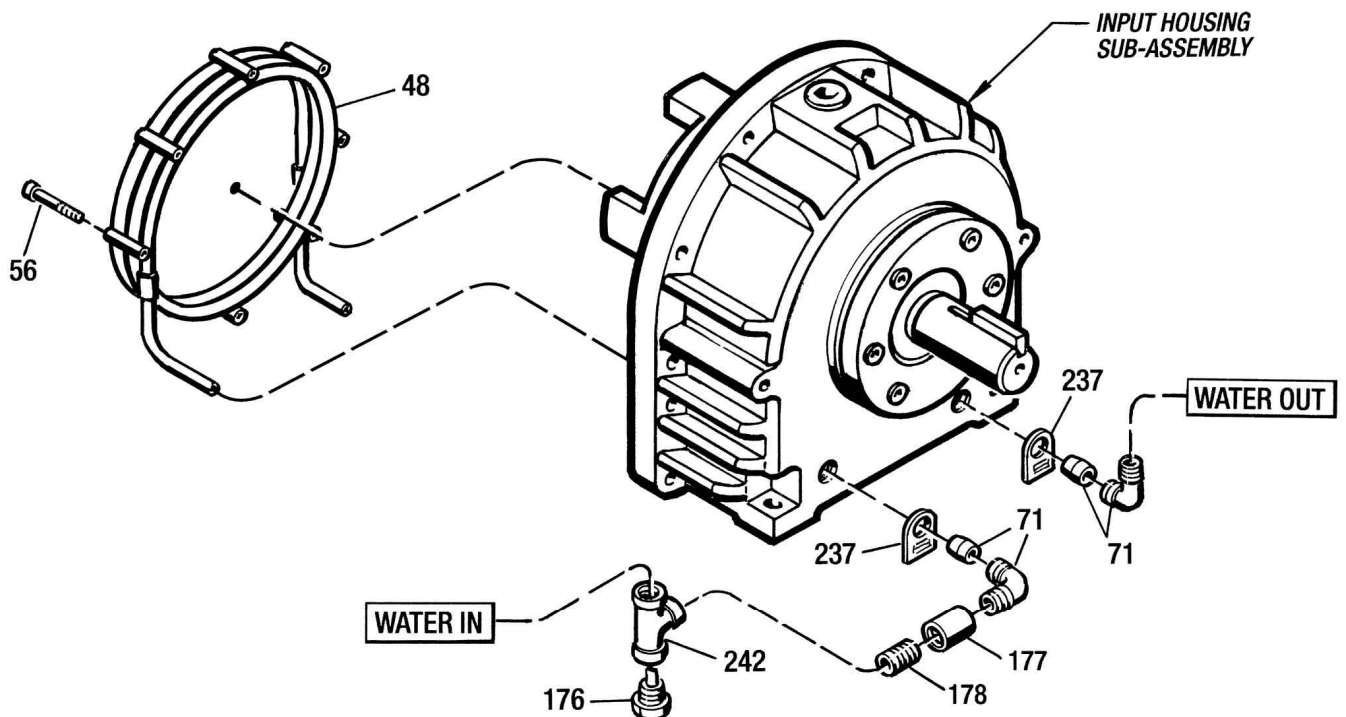


Figure 10.6 - Fan Cooling and Water Cooling

(Repair Parts List for Figure 10.7)

**PIGGYBACK MOUNTING**

| REF<br>No. | PART NAME                          | QTY. | REF.<br>No. | PART NAME                                  | QTY. |
|------------|------------------------------------|------|-------------|--------------------------------------------|------|
| **45       | Breather.....                      | 1    | 148         | Bracket, Motor Mounting - I.P.....         | 1    |
| 74         | Pipe Plug, Sq. Hd. 1/2" NPT .....  | 1    | 149         | Bracket, Motor Mounting - O.P.....         | 1    |
| 76         | Soc. Hd. Cap Screw .....           | 4    | 150         | Soc. Hd. Cap Screw (w/o Fan Cooling) ..... | 2    |
| 77         | 90° Street Elbow, 1/2" NPT .....   | 1    | 152         | Jam Nut .....                              | 8    |
| 78         | 90° Elbow, 1/2" NPT.....           | 1    | 153         | Adapter Plate, Motor .....                 | 2    |
| 81         | Pipe Nipple, 1/2" 5" Lg. ....      | 1    | 165         | Mounting Bracket (w/o Fan Cooling).....    | 1    |
| 89         | Reducer Bushing, 1" x 1/2" .....   | 1    | 254         | Stud .....                                 | 4    |
| 90         | Reducer Bushing, 3/8" x 1/4" ..... | 1    | 255         | Flat Hd. Cap Screw .....                   | 4    |
| 124        | Belt Guard, Piggyback .....        | 1    | 257         | Lockwasher .....                           | 4    |
| 136        | Street Elbow, 1/4" NPT .....       | 1    | 265         | Lockwasher (w/o Fan Cooling) .....         | 2    |
| 137        | Pipe Coupling, 1/4" NPT .....      | 2    | 268         | But. Hd. Cap Screw (w/o Fan Cooling).....  | 4    |
| 138        | Pipe Nipple, 1/4" NPT .....        | 2    | 288         | Spacer (w/o Fan Cooling) .....             | 2    |
| 139        | 90° Street Elbow, 1/4" NPT .....   | 2    | 305         | Soc. Hd. Cap Screw .....                   | 2    |

\*\* - Indicates parts in Major Overhaul Kit.

## PIGGYBACK MOUNTING

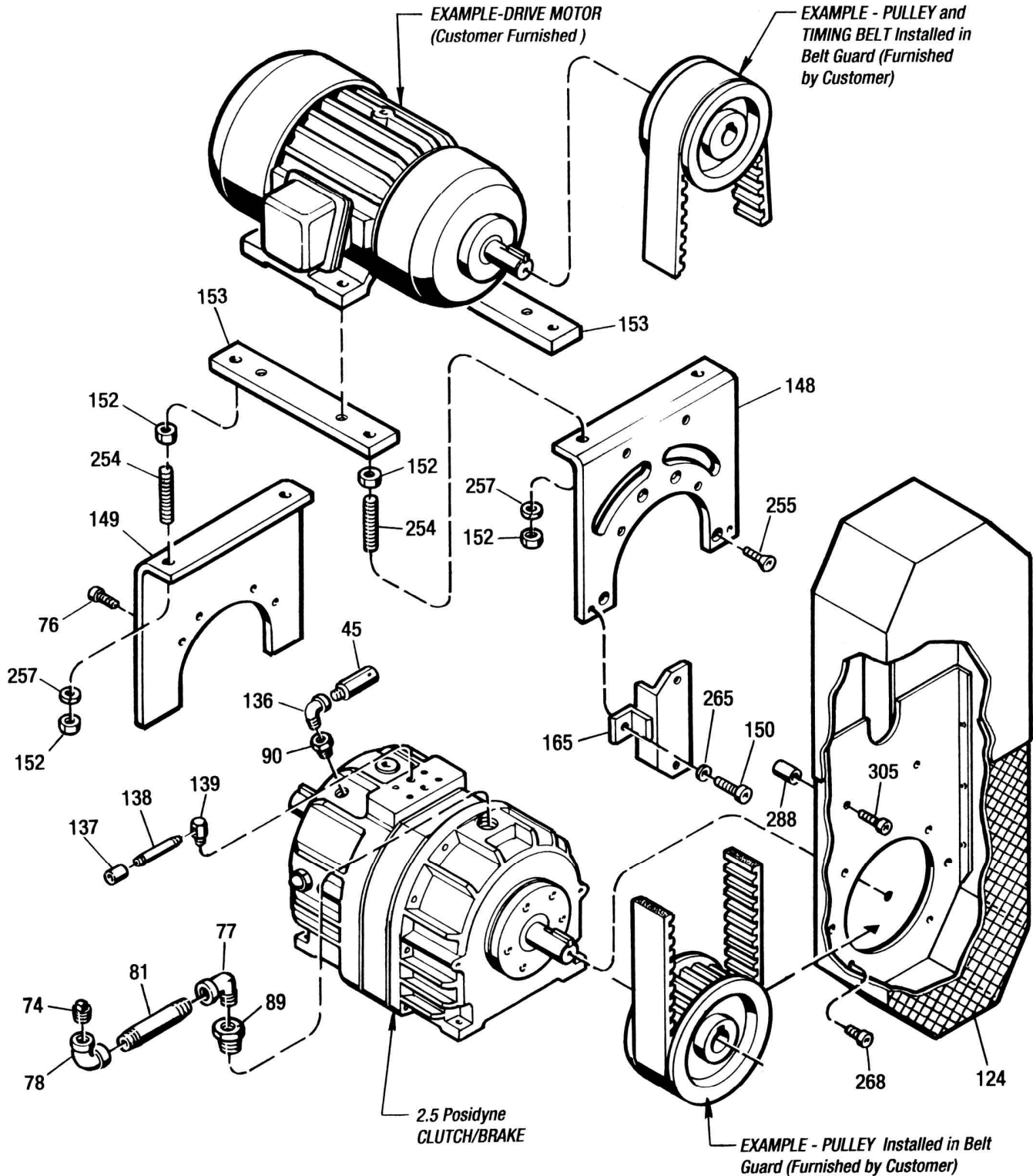


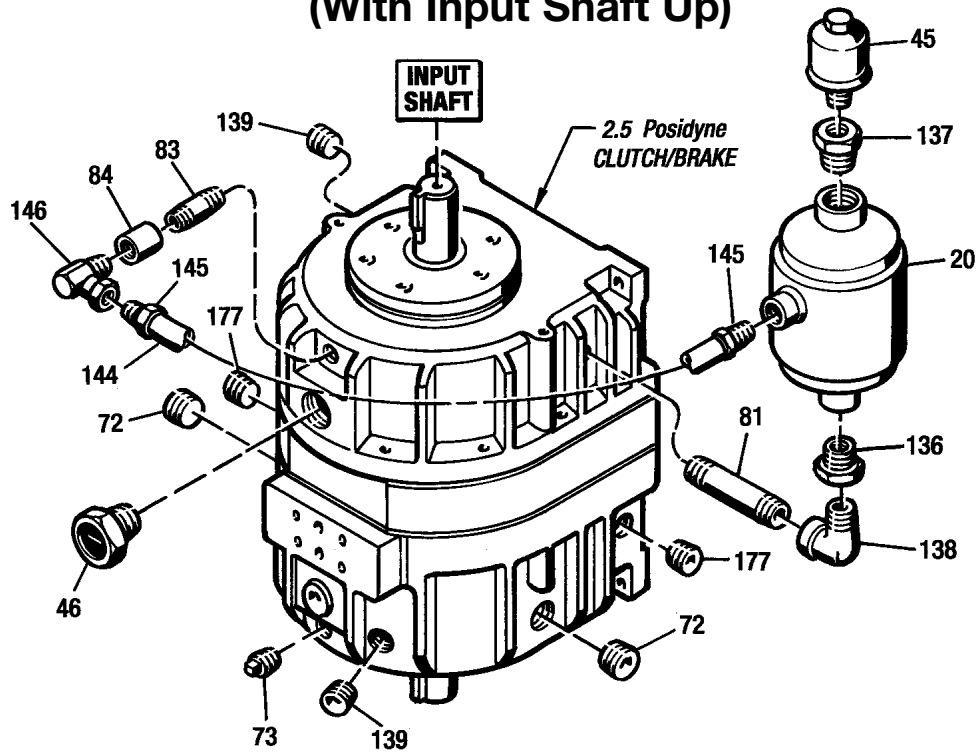
Figure 10.7 - Piggyback Mounting

*(Repair Parts List for Figure 10.8)*  
**VERTICAL INSTALLATION**

| REF<br>No. | PART NAME                                        | QTY. | REF.<br>No. | PART NAME                          | QTY. |
|------------|--------------------------------------------------|------|-------------|------------------------------------|------|
| 20         | Expansion Tank .....                             | 1    | 136         | Reducer Bushing, 1/2" x 3/8" ..... | 1    |
| **45       | Breather.....                                    | 1    | 137         | Reducer Bushing, 3/4" x 1/4" ..... | 1    |
| **46       | Sight Gauge .....                                | 1    | 138         | 90° Street Elbow, 3/8" NPT .....   | 1    |
| 72         | Pipe Plug, 1/2" NPT .....                        | 2    | 139         | Pipe Plug, 3/8" NPT .....          | 2    |
| 73         | Pipe Plug, Mag. 1/4" NPT .....                   | 1    | 140         | Face Bushing, 1/2" x 1/4" .....    | 1    |
| 74         | Pipe Plug, 1/4" NPT .....                        | 1    | 144         | Push-Lok Hose.....                 | 1    |
| 81         | Pipe Nipple, 3/8" x 3" Lg. ....                  | 1    | 145         | Hose Fitting .....                 | 2    |
| 83         | Pipe Nipple, 1/4" Close (With Fan Cooling) ..... | 1    | 146         | Swivel Connector .....             | 2    |
| 84         | Pipe Coupling, 1/4" NPT (With Fan Cooling) ..... | 1    | 177         | Pipe Plug, 3/8" NPT .....          | 2    |

\*\* - Indicates parts in Major Overhaul Kit.

## VERTICAL INSTALLATION (With Input Shaft Up)



## (With Input Shaft Down)

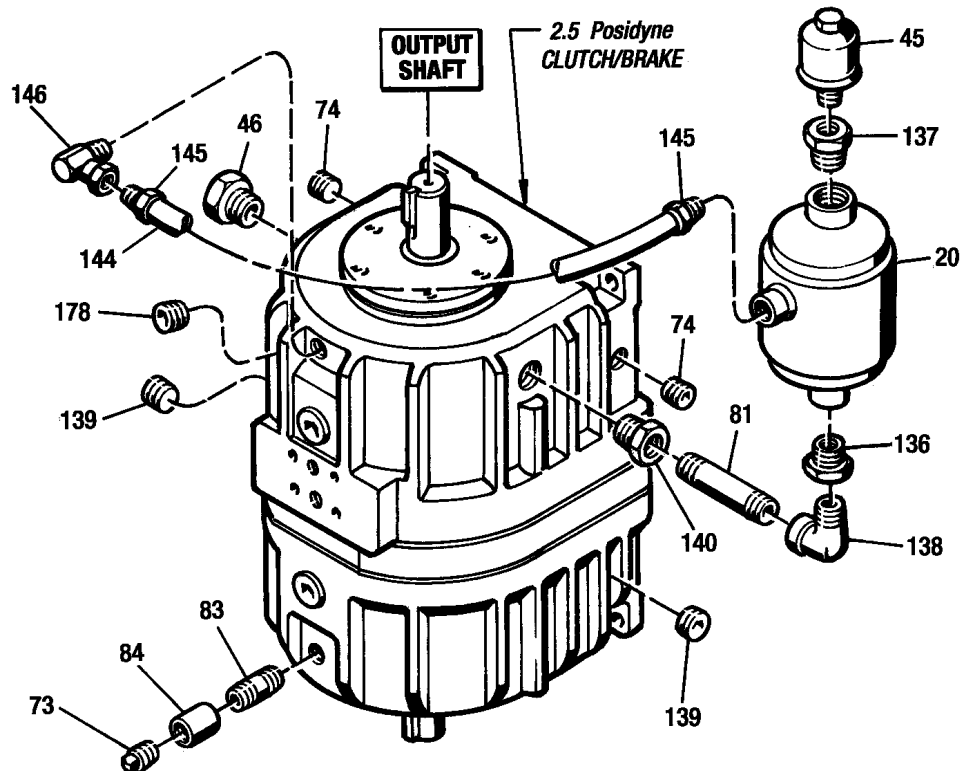


Figure 10.8 - Vertical Installation

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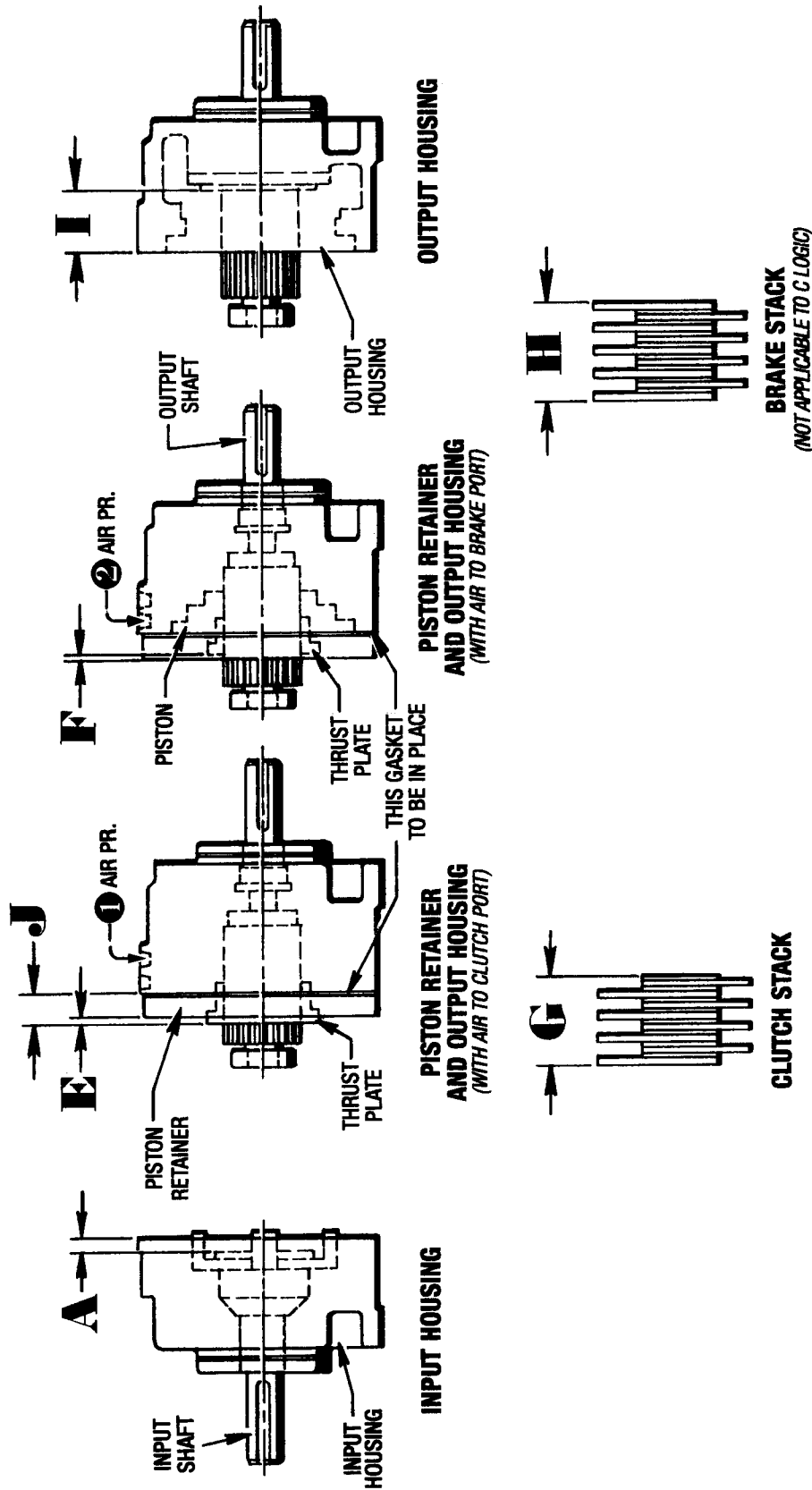


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## SIZE 2.5 Posidyne DIMENSIONAL CHECK SHEET



2.5 Posidyne CLUTCH/BRAKE DIMENSIONS (Inches)

| LOGIC     | A    | E     | F*   | G*   | H*    | I     | J    |
|-----------|------|-------|------|------|-------|-------|------|
| SA, A, B  |      |       | .110 | .662 | .7245 | 2.441 | .798 |
| S, SCP, P | .594 | .0799 | .228 |      |       |       |      |
| C         |      |       |      |      | ----  |       |      |

\* MEAN DIMENSIONS

① MAX. TEST AIR PRESSURE - 20 PSI for S, SA, SCP and P Logics.  
- 40 PSI for A and B Logics.

② MAX. TEST AIR PRESSURE - 20 PSI for S, SA, SCP and P Logics.  
- (Not Applicable for A and B Logics.)

ALL DIMENSIONS ARE WITH GASKETS REMOVED, EXCEPT WHERE NOTED.

Figure 10.9 - Dimensional Check Sheet

# Manual Revision & Printing History

## 2.5 Posidyne Clutch/Brake

| REVISION<br>NUMBER | REVISION<br>DATE<br>(Mo./Yr.) | PRINTING<br>DATE<br>(Mo./Yr.) | REVISION/ACTION DESCRIPTION                                                           | REVISION<br>INITIATED<br>BY:<br>(Name) | REVISION<br>MADE<br>BY:<br>(Name) |
|--------------------|-------------------------------|-------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|-----------------------------------|
| 502-2.5-001-01     | -----                         | 10/03                         | Printed                                                                               | -----                                  | -----                             |
| 502-2.5-001-02     | 3/04                          | -----                         | Added Friction Disc and Drive Plate Quantities to page 24.<br>Added Revision History. | M.<br>Sharratt                         | Brooks                            |

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